WEDNESDAY, MARCH 1, 1871.

ORIGINAL LECTURES.

CLINICAL LECTURE

ON INFANTILE PARALYSIS.

(Concluded from page 170.)

BY JOHN S. PARRY, M.D.,

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ALLOW me to allude, however, a little further to the symptomatology of the malady. The advent of the paralysis was sudden, and occurred during sleep,—an ordinary character of the disease. It is usually preceded by some premonitory symptoms, such as the irritability of temper and feverishness which were present in this case; but you must remember that the palsy may be the earliest and latest symptom. I have now under my care an infant ten months old, who, six weeks ago, awoke in the morning with his left arm completely motionless. He is a remarkably vigorous child, and was not known to have been at all unwell when put to bed the preceding evening. The only additional evidence of ill health was a slight eczematous eruption on the head and neck. He has now entirely recovered from the paralysis, though the skin-disease has not improved.

Rarely the disease is ushered in by a convulsion; and there are two such cases in the wards to-day. One is the patient who was the subject of my last lecture. You will remember that I called your attention to the deformities of her feet and hands when she was before you. The other is a little girl in one of my colleague's beds in the asylum. As a rule, the disease is primary; but it is sometimes secondary, following hooping-cough, measles, pneumonia, and other affections.

It is stated that this paralysis is usually an incomplete paraplegia. In the present instance it was a hemiplegia; and I must confess that I have seen more examples of this than of any other variety. It may affect any of the extremities, either alone or combined. It is rare, however, to see the arm of one and the leg of the opposite side affected; though I saw one case of this kind in this hospital two years ago. The loss of power rarely extends beyond the parts supplied by the spinal cord, and it is apt to affect single muscles or groups of muscles. The left arm and leg seem to have been uniformly paralyzed at the outset of the disease in this patient, but now the loss of power is limited in the upper extremities to the extensors and supinators of the hand, which, Mr. Adams* states, are always affected together. In the leg, the diseased muscles are the extensors of the toes and flexors of the foot. According to the authority just quoted, the latter group is the one most frequently involved. The former is attacked second in frequency, while the extensors of the leg are the third set of muscles in the category, with which is generally associated paralysis of the extensors of the toes and flexors of the foot, or those of his first group.

Single muscles are apt to be affected in the following order of frequency: the extensor longus digitorum of the toes, the tibialis anticus, the deltoid, and, lastly, the sterno-mastoid.†

You see that the extent of the paralysis varies much. In the affected parts it is usually complete so far as motion is concerned, and the height of the disease is at its onset. With sensation it is different. In this history you heard that there was no marked change in sensibility; but, if altered at all, there was slight hyperæsthesia, which West says is usually true. In some cases there is no change in sensation; less frequently it is slightly blunted for a time. The special senses are not affected.

The diseased part is not rigid in the early stages, nor does it become so afterwards. As was the case here, the extremities fall as if dead, when elevated. Decrease of temperature attends the loss of power, the difference between the healthy and the diseased side sometimes amounting to ten degrees.‡ At this time the circulation is very much interfered with in the palsied part, and the limb becomes pale as well as cold. We have no such symptoms in our present patient, though I have no doubt that they were present.

Electro-muscular contractility demands some notice before I cease speaking of the symptoms. I have carefully examined the condition in Ellie's arm and leg by means of the induced current. She became very much alarmed at the use of the battery, and, though she prevented a perfect investigation, it is certain that the contractility is not entirely destroyed, but is very much lessened, in the affected muscles. At the commencement of the malady the muscles respond as usual to either the induced or the direct current, but as the case progresses and atrophy occurs they cease to contract, or do so but feebly, when tested in this manner. The cause of this we will study as we progress in the lecture. To one point, however, I wish to direct your attention especially. In some instances, after the muscles have ceased to contract when the induced current is employed, they will respond vigorously to a slowly-interrupted direct current. The importance of this fact can hardly be overestimated, especially as the same cases, after a longer or shorter therapeutic use of the direct, react upon the application of the induced current.

I shall now allude again to the production of deformities after an attack of infantile paralysis. This matter is of the greatest practical importance, gentlemen, and I beg you to remember the relation existing between the two conditions. This affection is the potent cause of almost all the deformed shrivelled limbs that find their way to our orthopædic hospitals; and I ask you to remember the statement that many cases of non-congenital club-foot have their origin in the disease which we are studying. In connection with this, remember, too, that Dr. Taylor, of New York, asserts§ that these deformities are always preventable,—which is no doubt true in many instances.

The inner surface of this child's wrist presents two well-defined ridges, as you now notice. These are produced by prominence of the tendons of the flexor carpi radialis and flexor sublimis digitorum; and I have no doubt that it has occurred to you that the deformity so marked in this hand is the result of contraction of these muscles. Such, however, is not true. That they are shortened we cannot deny; but this is the result rather than the cause of the deformity. Here the power of the supinators and extensors has not improved with that of the other muscles of the forearm, and the hand is hence given over to the control of their opponents, which have produced this malposition, not by active contraction, but by a simple shortening, which was necessary to enable them to continue their function when their points of origin and insertion are approximated. This is the "adapted atrophy" of Paget, in which the fault is not in the shortened muscles, but in those which are stretched and paralyzed. Dr. Taylor believes that these distortions are all the result of positions assumed as the effect of gravity immediately

* Club-Foot: its Causes, Pathology, and Treatment, p. 64.
† Ibid.

‡ Dr. W. A. Hammond, Jour. Psycholog. Med., vol. i. p. 53.
§ Infantile Paralysis and its Attendant Deformities, p. 44, Phila., 1866.

after the occurrence of the paralysis, and hence that they are always preventable.

As yet, nothing has been said of the changes which the paralyzed muscles undergo. These are very interesting, and consist essentially in fatty degeneration. In order to enable us to examine them, Duchenne has devised the instrument which I now show you. As you see it, it resembles an ordinary trocar, but you notice that it consists of two parts, one sliding on the other, while in the stationary portion there is a shallow groove with a small cavity, where the sliding and fixed parts come in contact when the instrument is closed. I yesterday introduced it closed into the body of the affected muscles, both in the thigh and leg, opened it when fairly in position, and, closing it quickly, brought away sufficient muscular tissue to make satisfactory microscopical examinations. Before using the instrument, I confess, I felt somewhat fearful of the result. You see that it is large to use for diagnostic purposes; but it is now twenty-four hours since it was introduced, and there are very slight evidences of inflammation at the seat of punctures. Smaller trocars have been constructed, but most of them have failed. If you wish any further information in regard to them, read the account of the proceedings of the Pathological Society of this city, published in the *American Journal of Medical Sciences* for October, 1869, where my friend Dr. Keen describes and gives figures of several instruments of this kind. In both of the specimens of muscular fibre obtained, I found well-marked fatty degeneration. Some of the fibres seemed to be nearly healthy, but most of them were more or less granular, and the transverse striæ were but poorly marked. In some, these were entirely destroyed, and inside the sarcolemma were large fat-globules. In a few instances nothing was left but empty transparent tubes of myolemma, to which a few granules and fatty globules still adhered.

As we have no clinical microscope belonging to the hospital, I show you a photograph of Mr. Adams' plate, representing the degeneration of the muscles in infantile paralysis, which has been most accurately copied by Mr. Bell, at 1200 Chestnut Street, who, by the way, has made a specialty of anatomical photography. From what I have said, it is evident that the fatty degeneration has advanced to a considerable extent in this case. I wish to impress upon your minds, however, the fact that this is not the cause, but is the effect, of the paralysis; and that while it is the usual, it is not the invariable result of the lesion which produces the loss of power. In some cases it is not present at all, as was shown by Dr. Hammond; while in others the whole muscular tissue appears to be replaced by fat, as in the case which Mr. Quekett records in his Lectures on Histology.

It is probable, too, that in a majority of the cases the alteration is more granular than fatty. The characters presented when the muscle is examined by the microscope have a marked influence on the prognosis, for if these alterations have progressed to any extent, it is by no means so favorable as if they were slight.

In regard to the further pathology of infantile paralysis, I have already stated that the spinal cord is the part of the nervous system at fault. Precisely what changes this undergoes it is very difficult to say. It is probably, however, congestion of the cord; but very few autopsies have been made to verify this statement, for the simple reason that infantile paralysis, no matter what may be its duration, is not a fatal disease. In most of the few autopsies which have been made, we must confess that but slight evidences of congestion have been found; but by analogy the view which I have presented is strongly supported. For the arguments in its favor I refer you to Dr. C. B. Radcliffe's article on this subject in Reynolds' System of Medicine. It must not be denied, however, that equally good authorities, among whom is Dr. C. Hanfield Jones, say that the palsy in these cases is due to spinal paresis; but, unfortunately for this view, in some of the more recent autopsies of children dying after having had infantile paralysis, organic changes have been found in the cord, and such as seem to us to support the opinion that the original affection of the organ is congestion. This lesion has only been discovered since J. Lockhart Clark's admirable method of preparing nervous centres for microscopic examination has been introduced, and consists in what is called sclerosis of the cord.* The essential character of this is increase in the connective-tissue elements of that structure, which produces pressure upon the nerve-tubules and results in their atrophy and destruction of their functions, thus giving rise to permanent paralysis. The lesion is originally congestion, which leads to increased nutrition and proliferation of the connective tissue. In the first instance the size of the cord may be augmented, while afterwards it undergoes contraction. Compare this process in the spinal cord with cirrhosis of the liver, where we find, first, congestion, then, it may be, a low form of inflammation, with increased proliferation of the connective-tissue elements of the organ, which lead to pressure and atrophy of the secreting elements of the structure, with destruction of its function. Hence, gentlemen, you see that we believe that sclerosis of the spinal cord is rather the effect of the original lesion which produces the paralysis; in fact, that it and the fatty degeneration of the muscles have precisely the same relation to loss of motor power. In some cases it is true that other lesions have been found, as thickening of the meninges, or small clots or tumors pressing upon the cord. When sclerosis is found after death, it is said to involve the antero-lateral columns chiefly.

What part sclerosis and antecedent congestion of the spinal cord play in the production of congenital clubbed foot and hand I cannot say; but it has occurred to me that the pathology of these cases may be somewhat similar to that of infantile paralysis, and that they may have their origin in congenital sclerosis of the cord.

Treatment.—I have but little to say upon this point this morning.

If what I have just said in regard to the condition of the spinal cord is true, the indications are, first, to relieve the congestion of that organ, and, second, to prevent the increased proliferation of the connective tissue or sclerosis of the cord.

The former is to be effected by the use of mild counter-irritants to the back, or even by the local abstraction of blood, by leeches or cups applied along the spine. The latter, however, is to be employed only in strong and robust children. At the same time, I would advise you to administer ergot, because this agent, it is asserted, has the power of diminishing the amount of blood in the cord. This it does by stimulating the vaso-motor nerves and causing contraction of the vessels.

Writers upon this subject—and among them Meigs and Pepper†—recommend the administration of belladonna, alone or in combination with ergot, in the treatment of congestion of the spinal cord. I know nothing practically of its effects in infantile paralysis, as I have always confined myself to the use of ergot in the early stages of the disease, and have reason to be satisfied with the results.

Iodide of potassium is to be employed as an absorbent, to remove the new material produced by increased proliferation of the connective tissue in the cord. Hence you see that these two remedies are useful in different

* Charcot and Joffroy, *Archives de Physiologie*, Jan. 1870, p. 134.
† Diseases of Children, Phila., 1870, p. 582.

stages of the affection,—the former early and the latter later in the progress of the case. This child has taken large quantities of the iodide, given for the inherited syphilis from which she is also suffering, but without much apparent benefit to the nervous disorder.

Of course you would support the strength of your patient if there be any debility, and, if anæmia be present, iron should be administered, of which the best preparation is the syrup of the iodide, which was given in this case combined with the iodide of potassium.

Strychnia and other preparations of nux vomica are not to be given until after the acute stage has passed, when they are very useful.

You should never neglect local remedies in the treatment of infantile paralysis. What you desire to do is to increase the power of the muscles.

The best local agent is electricity; and in using it the affected muscles are to be carefully isolated, and the remedy applied to them alone. In this connection, do not forget the fact which I have already stated, that in some instances where the diseased muscles will not respond to the induced current they will contract upon the application of a slowly-interrupted direct current, and that after the latter has been employed for some time they regain power, and will contract when the induced current is tried; and at that time it is well to substitute this for the other variety of electricity.

I have no time this morning to speak of the importance of proper gymnastic exercises in the treatment of the disease, and I therefore refer you to your text-books for information on this point.

IMPROPER FOOD

AS A CAUSE OF DISEASE AND DEATH IN INFANCY.

BY W. M. WELCH, M.D.

Read before the Philadelphia County Medical Society, October 13, 1869.

MR. PRESIDENT: A physician cannot long engage in the practice of his profession, in large cities especially, without having his attention directed to the large mortality of young children within their first year after birth.

Statistics gathered with great care show that in France one-fourth of all the children born die before they have completed their first year; and the reports of the Registrar-General of England give the proportion of deaths of children under one year old to the births, in England and Wales, as about one to six, while of the whole number of deaths, one-fourth are infants within their first year.

But let us look at home. Philadelphia, as may be seen by consulting the reports of the Board of Health for 1867 and 1868, gives a mortality of infants within the same period of their life of almost one-third of the whole number of deaths.

(The proportion of deaths to the births cannot be estimated with any degree of accuracy, on account of the incompleteness of the return of births.)

This is a fearful drain upon human life at its very threshold, and renders the study of the diseases of infancy one of peculiar interest. If no other motive should urge a physician to their thorough investigation, philanthropy alone, it seems to me, presents irresistible claims.

It has been said that the lives of many infants with faulty constitutions are withdrawn by the Creator as a means of protecting future generations against greater maladies. But before pronouncing this decree of fate upon these innocent sufferers, let us be sure that the causes which produce disease in them are not like those which lead to disease in general,—viz., the violations of some law of health; and as the laws which regulate their healthy development are most susceptible of violation, we would very reasonably expect to find them fall the most frequent victims.

From the moment of birth the child is actively engaged in the work of development. The changes in its structure are necessarily great and rapid; the constant and hurried transition through which every part is passing is a fruitful source of disturbed action. It therefore requires the most vigilant care, with special and guarded dietetics.

The powers of digestion and assimilation in the young infant are exceedingly feeble. Indeed, Nature has so beautifully adapted the means to its wants that it is not required to perform much labor in this particular, for its natural food needs but little elaboration before it is prepared to be taken into its economy. The mother's milk, therefore, is its most suitable nourishment, and when there is nothing to forbid her nursing her child, she should regard it as her imperative duty to perform to it a mother's part, and give it the benefit of that food which Nature has not only prepared for it, but has also declared to be more or less essential to its healthy development. She should also remember that by an obstinate and cruel refusal to discharge to her infant an obligation which mothers of other days looked upon as sacred, she alone is responsible for whatever may follow in consequence.

Fashionable life makes such numerous demands upon the time and energies of its votaries, that, rather than give up their amusements, they prefer to place their children under the care of paid nurses; but let them consider that in so doing it is not unlikely they may lose a portion of their maternal love, or else fail to receive the entire affection of the child, for no ordinance of God can be violated with impunity.

The dangers which attend dry-nursing, or raising by hand, should be more generally appreciated by mothers. Many think it no sin to deprive an infant of the breast, while they deceive themselves by the false notion that by raising it on the bottle there will be a saving of trouble. Let them be taught the difficulties of adapting food to the wants of the infant when they step aside from Nature's laboratory, as well as the inevitable dangers which attend the experiment.

Dr. Merriman says of dry-nursing, "It has been part of my duty to endeavor to ascertain the amount of mortality among infants from this source, and, after much careful inquiry and investigation, I am convinced that the attempt to bring up children by hand proves fatal in London to at least seven out of eight of these miserable sufferers; and this happens whether the child has never taken the breast at all, or, having been suckled for three or four weeks only, is then weaned. In the country the mortality among dry-nursed children is not quite so great as in London, but it is abundantly greater than is generally imagined. If parents were fully aware of the hazard to which their children are exposed in the endeavor thus to bring them up, they would rarely choose to place them under the care of the dry-nurse." The high death-rate in asylums and hospitals for foundlings is abundantly suggestive of the dangers attending artificial feeding,—forty, fifty, sixty, and even as high as eighty and ninety per cent. being destroyed. In the foundling-hospital at Vienna the mortality has been as high as 92 per cent.; at Brussels, 79 per cent.; at Madrid, 67 per cent. In the foundling-hospital at Dublin it appeared, many years ago, on inquiry by Parliament, that of 10,272 children sent to the infirmary of the hospital, during a period of twenty-one years, only 45 recovered,—a statement which at this time, as has been remarked, seems almost incredible. A different mode of feeding was instituted. Wet-nurses were employed, and the children sent with them to the country. The

results were highly beneficial. Under this improved plan, in one year 2168 infants were taken into the house, and only 486 died,—a most marked improvement.

The mortality among artificially-fed children in private practice is not so great as in hospitals for foundlings, although in large cities, and especially among the poor, it would be found to fall only a little short, I fear, if statistics were carefully gathered. When I meet with an infant among the indigent so unfortunate as to be deprived of its mother's breast, I am in the habit of looking upon it as having received its passport to the grave.

As much depends upon the care and attention which children fed by hand receive, we may therefore expect to find, as we do, the mortality somewhat less among the better classes, who have it within their power to supply more nearly the child's necessary wants. I quite agree, however, with Dr. Combe, who says, "We must not infer that, among the wealthier classes at least, nothing more can be done for the preservation of infant health and life. On the contrary, we have too good reason to believe that even among the best-educated classes many lives are cut short by mismanagement in infancy, which might be saved if the parents only possessed in time a portion of that knowledge and practical sense which dire experience sometimes impresses upon them when too late."

We have said that we believe it to be the duty of every mother to nurse her own child; but, as circumstances beyond control sometimes occur to deprive the infant of its natural food, we are then forced to provide nourishment for it; and here I believe it to be the imperative duty of parents residing in large cities to procure suitable wet-nurses, whenever it is within their means to do so. If this cannot be done, we must then look to art to furnish a substitute. I think it would require no labored argument to convince every gentleman present that it is to the milk of some animal we are to look for the best substitute. Milk, whether from the human subject or from the animal, is composed essentially of the same ingredients, the difference being only in their relative proportion. Providence has so beautifully provided for the wants of all creatures, that these ingredients are made to vary in the exact proportion to meet the wants of the young of each particular animal. It is evident, therefore, in providing a substitute for the mother's milk, that we should choose that which most nearly resembles it, or it should be made to do so by proper modification.

By referring to a table of analyses of milk, we see in asses' milk the closest resemblance; but, as this can rarely be procured, cow's milk, on account of the facility with which it can always be obtained, is the one to which recourse is usually had. It is important, too, that the milk should be taken from a healthy cow, at liberty to feed and graze at pleasure,—not stall-fed,—and, if possible, always from the same animal; because, as Dr. Dewees remarks, "different cows feeding upon the same materials often give different qualities of milk, and the stomach very generally becomes reconciled more easily to any one certain quality than to a mixture."

The milk of the cow, being intended to meet the wants of a strong and vigorous animal, cannot be rationally administered to a young and delicate infant, of much feebler digestive powers, without first undergoing some modification.

The difference between human milk and cow's milk, as ascertained by analysis, is as follows. Human milk contains—casein, 32, sugar, 36, butter, 29; cow's milk—casein, 63, sugar, 28, butter, 40. It will be seen from this that if cow's milk be reduced one-half, the casein will be about the same as in human milk, the butter slightly less, and the sugar only one-third of what it should be. In adapting it, therefore, to an infant, the first six or eight weeks it should be diluted with equal parts of water, have added a little sweet cream, and must be sweetened by adding to each six ounces of the mixture about one half-teaspoonful of sugar of milk, or lump sugar; the ordinary brown sugar should never be used, as it contains material which will more readily decompose and give rise to fermentation. After six or eight weeks the dilution need not be so great; one-third water will probably be sufficient. After three or four months the quantity of water may be still further reduced,—say one-fourth water to three-fourths milk. And after six months the milk may be given undiluted. During all this time the quantity of sugar and cream should remain the same. Any change in the dilution of the milk must be made with great care; for we must recollect that we can at the best but poorly imitate Nature in her increase of the casein in proportion to the growing wants of the child.

The rule which I have given will not apply to the milk which is served from door to door in large cities. Indeed, no rule will apply to such milk, for it is always of uncertain quality. Each case must determine for itself the degree of dilution, if any, and the mode of preparation. Notwithstanding the greatest possible care in the use of this milk, we too often find that the child's life will be sacrificed, unless a wet-nurse be obtained or the child removed to the country.

The intervals of feeding should be regular, and the quantity given should also be carefully regulated. For the first two or three weeks, three or four fluidounces every two or three hours will, generally speaking, be sufficient. As the child grows older, this quantity must be gradually increased. At this rate it will be seen that the child is getting in twenty-four hours at least a pint of pure cow's milk,—which ought to be sufficient, if properly digested, to meet its wants at this early age.

The mode of administering the milk is also important. It should always be given in imitation of Nature's way,—by sucking. A child will almost always instinctively suck from its earliest age. By this means it swallows the milk very gradually, and is therefore less apt to overload its stomach. The first show of indifference on its part is a sure sign that it has enough, and it should never be pressed to continue. When it has finished its meal, the bottle should be at once removed; for if permitted to suck at an empty bottle it will swallow air, which will give rise to colic-pains. If any milk remains in the bottle, it should be at once emptied out, and not kept for a subsequent feeding, as it is liable to undergo fermentation. The bottle and all parts connected with it should then be well cleansed and placed in water until required again. If perfect cleanliness be not scrupulously observed, the bottle will soon smell sour, showing that some milk has been left to ferment. Fresh milk added while this remains will turn sour in a very short time. The sugar and water should not be added until the meal is required. The mixture should then be gradually raised to a temperature of 95 to 98 degrees. Should any tendency to acidity be observed in the milk, it should be rejected forthwith. No attempt at its supposed restoration should be made, by the addition of sugar or other agents, as these will eventually but increase the evil.

These precautions may seem minute, and, to some, unnecessary; but I feel that their importance cannot be overestimated. In proportion as they are deviated from, will the risks to the child's life increase. They may also involve some little care on the part of the mother, whose duty it should be to supervise the preparation of the food; but she will be abundantly compensated for her trouble by securing what is most to be desired,—her child's life and health.

At about the sixth or seventh month it may be well

to give, in addition to the milk, some of the farinaceous articles, such as tapioca, farina, corn-starch, and the like. After the eighth or ninth month a little thin mutton- or chicken-broth may also be added to the diet.

The farinaceous articles are highly improper as food for very young infants, for three reasons,—viz.:

1. Because of their inability to digest them. The conversion of starch into glucose, or grape-sugar, is begun by the saliva and completed by the intestinal juices. Now, the saliva is not secreted in the infant before the fourth month, nor does the intestinal juice of a very young infant seem to have the power of converting starch into grape-sugar, as would appear from the fact that in post-mortem examinations of children who during their lifetime had been largely fed on farinaceous articles, a starchy film has been found lining the intestines, which yielded the characteristic blue color to the iodine test.

2. They do not contain the four classes of food in the proportion required for healthy nutrition,—viz., albumen, fatty substances, carbo-hydrates, and salts; all of which are contained in milk, in the form of casein, butter, sugar, and salts.

3. Supposing them to be digested, starches, and sugars into which starches are converted, have a greater affinity for oxygen than the albuminates have; they therefore tend to appropriate the oxygen which is required to combine with the waste tissues in order to effect their elimination, and they thus impede the proper nutritional changes; or, in other words, they are heat-giving rather than tissue-making materials.

While I regard the milk of an animal as the best substitute which can be furnished to a child in lieu of its mother's milk, it must not be forgotten that it can serve at the best only as a substitute, for it is not, and cannot be made, identical. It would seem, as every variety is composed of the same constituents, only varying in their relative proportions, to be an easy matter to balance these differences and thus make them identical. But it is not so. These constituents have different properties. Take, for instance, human milk and the milk of the cow. Examine their chief nutritive constituent,—casein. It will be found, if rennet be added to human milk, that its casein will coagulate into light, loose clots, formed by the aggregation of little flocculi, which offer no impediment to the feeble digestive powers of the infant, on account of being the most easily digested of all known articles. On the other hand, add rennet to cow's milk, and its casein will coagulate into heavy compact lumps. The same thing takes place within the child's stomach, as may be seen by observing the milk vomited shortly after feeding. I have seen these lumps so large and tough as almost to choke the child when in the act of vomiting them, and have even found it necessary to assist in their removal from its mouth and fauces. They also may frequently be found in its passages, and even in a large and compact mass in its stomach after death. I believe this difference between these two kinds of milk to be so characteristic that we may decide, with a great degree of certainty, whether a child is nursed or artificially fed, simply by examining the ejections from its stomach.

This heavy, dense clot, then, of cow's milk, unlike the light, loose clot of human milk, is more difficult of digestion, and taxes the feeble digestive powers of the young infant to their utmost, which even then are often unequal to the task, permitting some of the casein to remain undigested, which, if not thrown off by vomiting, will speedily undergo fermentation and give rise to acidity and diarrhœa, and, if the error of diet be continued, may lead to more serious results.

Dr. Hiram Corson, of Montgomery County, who claims to have had a great deal of experience in the artificial feeding of infants, condemns very strongly the general practice of feeding them on cow's milk diluted. In fact, his excellent article on "Food for Infants," read before the State Medical Association at Harrisburg in 1868, seems to have been written chiefly for the purpose of condemning this practice. He there says, "I feel quite certain that it is almost as easy to raise children by hand, if they have an abundant supply of good, undiluted cow's milk, as it is by the breast." And again, when condemning the present teaching on this point by the professors in our medical schools, he says, "Rather let students be taught that the higher the organization of the animal the more abundant will be the nutritive constituents of the milk; and, as man is at the head of the animal creation, human milk is more highly organized than that of any other animal. If, then, you wish to use any other milk as a substitute for the mother's milk, instead of diluting it with water, it would be more appropriate to add to it some nutritive substance."

With all due regard to the experience of Dr. Corson, I must beg leave to differ from these views.

Is it a fact that more children suffer and die from insufficient feeding than from overfeeding? I doubt it. There can be no doubt, however, that, if an infant be not sufficiently fed, it will cry, worry its mother, grow sick, and eventually die of inanition. But may it not also be true that a child fed under this high-pressure system may have digestive powers unequal to the demands upon them, and fail to digest this dense mass of curd of undiluted cow's milk, which, if not thrown off by vomiting, will pass the pylorus undigested and utterly fail to meet its wants? If so, emaciation and the same train of symptoms as in insufficient feeding will follow; and finally such an infant will die, too, for lack of nutrition, although daily swallowing food sufficient to supply the wants of two healthy children, if properly digested.

It must be remembered that it is not that which is taken into the stomach that nourishes, but only that which is digested. Many a mother or nurse, ignorant of this fact, seeing that her child artificially fed does not grow properly, or, it may be, is losing its plumpness, will, therefore, infer that something more solid is required. With this view she resorts to one or more of the many vile farinaceous compounds prepared and sold in shops under the name of "food for infants." But, alas for the poor victim of misdirected sympathies! this but adds distress to its discomfort, which, if the error of diet be not corrected, will continue to increase until some kind disease intervenes to relieve it of its suffering.

Rather let mothers and nurses be taught that digestion is essential to development, and that without it a child may actually starve on the fullest diet. The simple introduction into its alimentary canal of large quantities of farinaceous and caseous material is not necessarily followed by a corresponding increase of development. In all cases in which the food of an infant is said to be insufficient, the stools should be carefully examined, and if there be found in them the hard whitish or cheesy lumps, so characteristic of coagulated casein, it will be strong evidence that too much rather than too little is being given.

It is probably true that, in spite of all possible precaution, some infants will now and then be found with whom cow's milk will not agree. Such, it is said, will often do well upon Liebig's food for infants, either alone or mixed with milk, although the milk by itself causes derangement. Before making any change, we should satisfy ourselves that it is the milk which is at fault, and not its mode of preparation.

Cow's milk may be rendered more digestible by the addition of some alkali; lime-water is perhaps preferable. As lime-water contains only about one-half of a

grain of lime to the ounce of water, it may be largely used in the dilution of the milk. This will in a great measure prevent the formation of those firm coagula of casein so difficult for the infant to digest.

Liebig's food, so popular with many, although a farinaceous compound, is said to be free from one of the objections at least which weigh against such articles in general. It is claimed for it that the malt which it contains converts the starch into grape-sugar, and thus relieves the digestive organs of a part of their labor. Of its practical virtues I cannot speak, as I have never used it.

It may not be uninteresting to pass in review some of the inevitable evils which follow the administration of improper food to infants. Irritation of the digestive organs will necessarily follow. Vomiting is speedily excited and the food rejected. This hint which Nature gives is too often disregarded by those to whose charge they are committed. Food of the same kind is given again and again, and soon the stomach loses in a measure its excitability, permitting a part or the whole of it to pass through undigested. The intestines then become irritated, and, in their effort to get rid of these undigested matters, diarrhœa is excited. The evacuations are often horribly offensive,—due to the decomposition or putrefaction which these matters have undergone. Such an infant would necessarily be expected to lose both flesh and strength; for, besides the weakness resulting from imperfect nutrition, there is the additional cause of debility from the repeated attacks of vomiting and purging, until soon its digestive powers are rendered so feeble that it is less than ever able to obtain any nourishment from the diet with which it is furnished. A child thus erroneously fed often has a voracious appetite, which should be interpreted to mean that the ultimate structures of its economy are not satisfied. The quantity of food that it will sometimes swallow is enormous, and it is a matter of surprise to its attendants that, in spite of all this, wasting continues. It becomes peevish, fretful, and irritable; when awake, it will cry almost incessantly at times from hunger, and then again from abdominal pains; and, to add to its suffering, it is also frequently attacked with obstinate cutaneous eruptions, particularly urticaria and strophulus. That affection of the mouth known as thrush is exceedingly common, and, when it occurs in an infant greatly reduced by a long course of improper feeding, betokens a condition of the digestive organs not at all favorable to the ready digestion and assimilation of food. If an infant of this description, with all power of endurance starved out of him, be overtaken by almost any acute disease, he will fall a ready victim to that which would be but a trivial ailment for a healthy child. Or if he escapes death from this cause, and continues to have supplied to him food which he cannot digest, the result will be the same, only a little longer deferred, as if all food were withheld. He will die of inanition. Or, if able to digest only a part of what is furnished him, his life may linger on, extreme emaciation attends him, his face bears the expression of age, his belly grows large, tubercles may or may not become developed, and, finally, skin and bones, he sinks and dies. A certificate is given of death from marasmus. Or, if the infant be injudiciously fed from his very birth, his miserable existence will be brought to a more speedy end, for such an infant rarely lives longer than three months. He will become so weakened by the vomiting and diarrhœa ensuing upon a bad state of nutrition as to be unable to make sufficient inspiratory effort to fill his lungs, and will die of sheer debility. Or, again, if he be overtaken by the warm weather of the summer season, cholera infantum will almost certainly end his existence. From these four diseases, therefore,—viz., inanition, marasmus, debility, and cholera infantum,—is due, I see by the reports of the Board of Health of this city, about one-half of our infant mortality.

It would be well were the evils of improper feeding confined alone to that class of unfortunate beings that are by necessity deprived of the breast. Many an infant, with a full fountain of milk from which to draw its supply, is needlessly and wantonly stuffed with articles of food not only useless, but positively hurtful, through some mistaken notion or capricious longing for a fat baby on the part of its mother or nurse. It is not uncommon to see children at six months, and at times even much younger, taken to the table with the family and fed upon a promiscuous diet. I need not tell you, gentlemen, that this is a fruitful cause of diarrhœa, convulsions, and a great variety of other diseases among children which we are called upon to treat. For, as Dr. John Clark wisely remarks, "it cannot be that a child's mouth without teeth, and that of the adult furnished with the teeth of granivorous and carnivorous animals, are designed by the Creator for the same sort of food."

By way of conclusion I would add, that as small things portend the danger in the artificial feeding of infants, so do small things go far towards warding it off. A word of advice in time will have the effect of staying death from many a home. The choice of diet and its method of preparation and administration are not unimportant matters, to be left to the judgment of the mother or nurse. Just as much precision is requisite in directing the diet of an infant as though it were drugs with which we were dealing. As these apparently small things, therefore, are observed or neglected, so will the scale of life be turned upwards or downwards.

NOTES OF HOSPITAL PRACTICE.

UNIVERSITY OF PENNSYLVANIA.

SURGICAL CLINIC OF PROF. D. HAYES AGNEW.

Reported by Dr. Frank Muhlenberg.

VESICAL CALCULUS.

CASE I.—GENTLEMEN: Of late years this Institution has been peculiarly favored with the large number of cases of stone in the bladder that have been presented for relief by an operation. For class demonstration they are not to the surgeon the most desirable, as the region in which he works must necessarily be a small and comparatively hidden one; so that, except to those occupying a position near him, the minutiæ of the various steps of the operation must be taken for granted rather than seen. It will not be necessary to repeat to-day, except in a cursory manner, the remarks I made at a former clinic on the history of lithotomy and the anatomical relations of the parts involved, for I presume that by this time you are, theoretically, sufficiently acquainted with the surgical anatomy of the perineal region to follow me in the various steps of this operation, with benefit to yourselves. The symptoms of stone in the bladder, which, as I then told you, are of a peculiar nature and somewhat common to bladder-trouble generally, have been all experienced by this little boy now presented before you. This patient, you observe, is quite young, being only six years of age, and is therefore an illustration of the surgical fact that about one-half of all the cases presented are children, and most of these under ten years of age. You will also notice that he is a *white* boy, for it is quite a rare thing indeed to have a negro presented for treatment. He does not reside in this city, but comes from Kutztown, Berks County,—a limestone district; but whether the water he has been accustomed to drink has had an effect in the formation of this calculus I am unable to state, although vulgar opinion would, as you know, favor such a view.

The symptoms to be observed in forming a diagnosis of this case are of two kinds,—*rational* and *physical*. The *rational* we may also divide into *local* and *general*.

The *local* are these. About three years ago, his parents observed that the desire to urinate was exceedingly frequent, both during the day and also at night, and that when the act was about being completed he cried frequently, as if from pain. He passed about this time a small concretion, and his sufferings were considerably alleviated. For some months past, however, they have returned with redoubled violence, and he now presents all the attending local symptoms of his former attack. In addition to the frequent desire to urinate, and subsequent pain, he has a constant inclination to go to stool, and to remain there, and suffers exceedingly from tenesmus during the act of defecation. There is, notwithstanding, less of that peculiar itching of the penis at its extremity, due to reflex action, which generally is so marked in cases of this character. It very often happens that the constant irritation which is thus induced produces frequent handling of the organ, resulting in an elongated foreskin and general enlargement of the organ, from which frequent priapisms ensue, as in the case we presented at a former clinic.

The *general symptoms* in this case, as is usual with children, are not very marked. His general health has not perceptibly suffered, and we therefore entertain a favorable prognosis.

No surgeon will be, however, or is allowed to be, satisfied with a diagnosis founded merely on rational symptoms, but must verify it by a *physical examination*. This I proceed to do by means of the metallic sound. As a precautionary measure, in order to clear out the large bowel and preclude the possibility of a mass of impacted feces interfering with the movement of the free end of the sound, and also to place him at rest for at least three days subsequent to the operation, I ordered him this morning an enema of soap and water. His bowels have been freely moved. I sounded him about ten days ago, and will, after having his bladder injected with a warm infusion of flaxseed, proceed to repeat the process before you. I distinctly feel the peculiar sensation imparted by the metallic instrument striking against the calculus; and now, having screwed the sounding-board to the handle of the sound, I judge that you also have this unmistakable evidence presented to your senses. While the patient is having the anæsthetic administered, I will merely repeat again that there are two modes of performing lithotomy,—the supra-pubic and the perineal. The first is but seldom practised, and of the latter there are three methods of procedure,—the median, the bilateral, and the lateral, with their various modifications. The last is the one that I much prefer, and it will be done on this patient.

The grooved staff being introduced is held by my assistant, Dr. Charles T. Hunter, hooked close up under the arch of the pubes, its convexity presenting slightly to the left side and the handle to the right. Upon the staff-holder depends much of the success of the operation; for—as I do not use the gorget, but only this bistoury—if he should, from anxiety to assist the operator, push the convexity too far outwards and backwards, the incision might be made along its groove as changed, and an untoward result ensue. I shall now, with this sharp-pointed, long-bladed bistoury, make my incision through the integument and fascia down to the membranous portion of the urethra, commencing on the left side about a line or two to the left of the raphé, immediately behind the scrotum, an inch in advance of the sphincter ani muscle, and extend it in a straight line to a point about half-way between the anus and tuber ischii. I proceed rapidly with the subsequent steps of the operation, not stopping to demonstrate the different layers of fascia, etc., but cutting down through the superficial, middle, and deep fascia and the fibres of the levator ani and transversalis muscles, until I have reached the membranous portion of the urethra. With the forefinger of my left hand guiding the point of the bistoury into the groove of the staff, I push it steadily along its curve and backwards through the prostate gland into the bladder; which incision is followed, as you see, by the gush of its fluid contents.

The next step, now that the viscus is cut, is to secure the stone. I introduce the forefinger of my left hand into the bladder, and, thus holding the sides of the wound somewhat apart, —having withdrawn the staff,—guide along my finger this forceps, held in my right hand. I feel the stone under my finger, and, after carefully seizing it with the forceps, I now present it to you as the result of the lateral operation for stone.

The subsequent treatment of the case will be the following: All débris will be washed out of the patient's bladder, an anodyne of tinct. opii deod. gtt. x administered, and he will be placed in bed with the ordinary folded sheet under him. No catheter will be introduced, but the urine will be allowed to discharge by the wound, and, as this gradually heals, it will seek its natural course. The bowels will be kept closed until about the third day, and anodynes administered pro re nata. The diet must be entirely of a fluid character, and composed of beef-tea, milk, etc. If any traumatic fever ensues, it will be treated on general principles.

[This case was treated subsequently as directed. The bowels were opened on the third day by an enema of soap and water. The urine began flowing by the urethra within a week, and the patient was discharged well, ten days after the operation, having suffered from no untoward symptoms. Time of incision until bladder was opened, twenty seconds; and calculus removed within one minute afterwards. Its weight was twenty-four and a half grains.]

VESICAL CALCULUS.

Case II.—This boy that I present to-day is from Camden, N.J., and is also *white*, but older than the former case, being fifteen years of age. His trouble began twelve years ago, with symptoms of a similar character to those of the former three cases I have had the pleasure of presenting to you. He now complains of a constant desire to urinate, doing so at least a dozen times during the day, and as often at night,—the pain at these times being often very severe, and the stream stopping suddenly while urinating. This pain is present both just before and immediately after the act of micturition. At different intervals he has passed small pieces of gravel. The prepuce is very much elongated, and the penis of a large size for a boy of his years. His urine presents a very muddy appearance, is loaded with urates, but does not give evidence of any disease of the kidneys. I sounded him some days ago, and discovered a stone; and, as a placebo for the constant irritation, I ordered him a suppository, nightly, of ext. hyoscyami cum opii pulv., āā, gr. j, and internally, to change for the time being the character of the urine, the following recipe: ext. buchu fld. ʒj, liq. potassæ, gtt. iij,—ter in die.

For your benefit, I will now sound him again. You hear, gentlemen, the peculiar distinctive sound given only by a vesical calculus. I must remove this by an operation, and that, as in the former case, will be the left lateral one. The subsequent treatment will be also the same.

[The bladder was reached in twenty-five seconds after the first incision, but, owing to the large size of the calculus, as it measured almost two inches and a quarter in diameter, it could not be removed until the incision was enlarged and considerable traction made by the forceps on it. The subsequent treatment of the case was the same as for Case I., and the patient was discharged about two weeks and a half subsequent to the operation, without having had any bad symptoms, except that during the second day some light traumatic fever arose, which soon yielded to an ordinary febrifuge. This calculus was of a flattened oval shape, and measured in circumference 4½ by 4 inches in the direction of its two diameters.]

ST. MARY'S HOSPITAL.

SERVICE OF DR. W. W. KEEN.

TETANUS TREATED WITH ENORMOUS DOSES OF CALABAR BEAN WITHOUT ANY MARKED EFFECT ON THE PUPILS. RECOVERY.

W. H. V., æt. 26, Prussian, farm-laborer, admitted to St. Mary's Hospital, September 25, 1869. Service of Dr. J. H. Grove.

History.—September 10, he was kicked in the belly by a horse. Had severe pain for some days, but received no treatment. On the second day he noticed stiffness of the jaws, and on the seventh day his legs became so stiff that he fell. He was placed in a stable, and lay there for eight days, utterly neglected.

Condition on admission.—When admitted, fifteen days after the accident, he was filthy and wretched beyond description; emaciated; muscles of face, neck, back, abdomen, and all the extremities rigid; opisthotonos well marked; utmost separa-

tion of the teeth, one-quarter inch; deglutition difficult and painful; articulation indistinct; voluntary movements of limbs possible, but difficult; slight tenderness over the epigastrium; breath exceedingly offensive; no stool for four days; pupils slightly dilated; no marks of external violence.

Treatment.—Purgatives at once; morphiæ sulph., ext. bellad., āā, gr. ⅙, and ext. conii gr. ij, every three hours, and chloroform to the spine, with milk-punch and beef-tea.

September 26.—Pulse, 104; resp., 16; axil. temp., 100° F. Sleeps most of the time, though easily aroused; otherwise no change.

September 27.—Pulse, 108; resp., 14; temp., 98⅘°. Offensive breath perceptible at several feet; muttering delirium; tetanic spasms; urine drawn off. Treatment continued, with potass. chlorat. gr. x and quin. sulph. gr. ij, t. d.

October 1.—Dr. Keen came on duty. Since the 27th he had gradually become worse. Pulse, 120; resp., 11; temp., 100°. Lips livid; but one stool since his admission; delirium and tetanic rigidity unchanged. Treatment changed to ol. tiglii gtt. ss, to be repeated till the bowels were open, and calabar bean, gr. ⅛, in the form of fld. ext., every three hours, each dose to be increased by gr. ⅛, and to be given by Dr. R. W. Hargadine, the Resident Physician.

October 2.—Pulse, 72; resp., 12; temp., 98⅘°. Pupils normal. The calabar bean to be increased gr. ¼ at each dose. Morning dose, gr. ½. Bowels not open, though he has taken ol. tiglii gtt. v.

October 3.—No spasms, but rigidity unchanged. Bowels open. Pupils unaffected. As the quality of the calabar bean used was not certain, some of the tincture (♏viij = gr. j) was obtained from Mr. O. S. Hubbell. Mr. H. made it fresh from some of the beans he had lately imported from Liverpool. They had been used effectively in a number of cases to his personal knowledge, and besides, when imported at Liverpool, some children had died from eating some of the beans found in the sweepings from the ship, as was proven in the trial for manslaughter which grew out of the accident. There was no doubt, therefore, as to the efficacy of the remedy. This tincture was ordered to be given every three hours, the first dose being ♏x, and each subsequent dose being increased by ♏x.

October 4.—Screaming with pain. Taking of the tincture ♏l.

October 5.—Pulse 64 and stronger; pupils unaltered; appetite much better; pain relieved; had a dark offensive stool; urine constantly drawn by catheter; rigidity as before. Taking of the tincture at evening ♏c.

October 6.—Pulse, 60; resp., 17; temp., 98⅘°. Has had none of the tincture since 11 P.M. Pupils dilated; crying with pain in face and back. The medicine was resumed (♏c) at 10 A.M. At 2 P.M., pupils smaller than before, but not yet normal; quieter.

October 7.—There being still no relaxation, the dose of the tincture was rapidly increased to ♏cc every three hours. Evening.—Rigidity somewhat diminished; no opisthotonos.

October 9.—Pupils normal; muscles still rigid; passed his urine voluntarily for the first time. Muscular rigidity being still marked, the tincture had been increased to ♏ccc doses.

October 10.—Pupils slightly contracted; trismus less marked.

October 12.—Much better; sitting up; trismus still marked; pupils normal. Increased tincture to ♏cccl.

October 13.—Walks about; no pain; appetite good; muscles all relaxed. Took a final dose of ♏c this morning.

October 28.—Discharged well. Has stayed to regain his strength.

Total quantity of tincture taken in ten days, ℥xvij, equivalent to 1020 grains, or over 100 grains per diem. At no time were the pupils contracted to less than say four-fifths of their usual size. The notes of this case were carefully recorded by Dr. R. W. Hargadine.

In response to Dr. Ogle's suggestion (*Med. Times and Gaz.*, October 22, 1870, and *Amer. Journ. Med. Sci.*, January, 1871, p. 274) that the temperature possibly increases in all cases towards evening, I append the following table of pulse, respiration, and temperature, for comparison with other cases:

		Pulse.	Respiration.	Temperature.
September	26, A.M.	104	16	100° F.
	P.M.	120	18	101.2
"	27, A.M.	108	14	98.4
	P.M.	104	14	96.2
"	28, A.M.	84	12	99.4
	P.M.	72	10	98.6
"	29, A.M.	68	10	98.6
	P.M.	84	10	96.6
"	30, A.M.	120	10	99.4
	P.M.	120	12	100.2
October	1, A.M.	120	11	100
	P.M.	108	11	100
"	2, A.M.	72	12	98.6
	P.M.	80	10	99.6
"	3, P.M.	76	16	99.2
"	4, A.M.	68	12	96
	P.M.	68	24	98
"	5, A.M.	64	13	97
	P.M.	60	16	98.4
"	6, A.M.	60	17	98.8
	P.M.	68	16	99
"	7, A.M.	66	14	99.4
	P.M.	72	18	98.4
"	8, A.M.	74	12	99
	P.M.	108	14	100.8
"	9, A.M.	84	16	97.8
	P.M.	84	14	98.2
"	10, A.M.	72	14	98
	P.M.	84	14	98.4
"	11, A.M.	96	16	98.8
	P.M.	80	15	97.2

OBITUARIES.

Dr. Thomas Mayo, F.R.S., a distinguished English physician and author, died in Wiltshire, January 13, in the 81st year of his age. He was born in London in 1790, graduated at Oxford in 1818, and became a Fellow of the Royal College of Physicians in the following year, being elected its president in 1857,—a position which he retained until 1862. His predecessor was the celebrated Dr. John Ayrton Paris, author of the "Pharmacologia," "Treatise on Diet," and other valuable works, while his successor was the no less distinguished Sir Thomas Watson, M.D., whose "Lectures on the Principles and Practice of Physic" are familiar to the profession on both sides of the Atlantic. Dr. Mayo was a most active contributor to medical literature, especially in the interesting department of medical psychology. He published, in 1831, "An Essay on the Influence of Temperament in Modifying Dyspepsia, or Indigestion;" in 1838, "Elements of the Pathology of the Human Mind;" in 1847, "Clinical Facts and Reflections;" in 1850, "Outlines of Medical Proof Revised;" and in 1854, a treatise on "Medical Testimony and Evidence in Cases of Lunacy." These were his principal works; but he wrote quite a number of valuable papers on kindred subjects in the medical periodicals of the day, as a specimen of which we may mention his contributions to the *Medical Gazette*, in 1843–44, on "The Impunity of Certain Attempts to Murder," etc.

Dr. Beverly R. Wellford, a prominent practitioner of Virginia, died at Richmond, December 29, in the 74th year of his age. He was highly esteemed both in public and private life, and had occupied numerous honorable and responsible positions in the profession, having been President of the American Medical Association, and also of the State Medical Society of Virginia, as well as Professor of Materia Medica in the Virginia Medical College.

Treatment of Chorea by Ether Spray to the Spine.—Dr. John Rose (*Lancet*, December 10, 1870, p. 813) reports three cases of rapid recovery from obstinate chorea by the anæsthetic ether spray. It was applied along the spine for four or five minutes at each time, and effected a cure after fifteen sittings. In obstinate cases he proposes to shave the occiput, and apply the spray there as well as to the spine.

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EDITORIAL.

MORAL EPIDEMICS.

NUMEROUS are the histories, both general and special, which tell us of the rise and fall of nations, the origin of creeds and systems of philosophy, phases of civilization, and extravagances of fanaticism; but there is still wanting a history of the human mind which shall give, among other things, a clear picture, if not an explanation, of the moral commotions and upheavals that agitate at one time an entire community, at another a whole people, or even many peoples, who have no sameness of interests or previous sympathy for each other. The character, magnitude, and extent of these sudden outbreaks are utterly disproportionate to the causes assigned, and demand fresh inquiry and study into the workings of the sentiments and propensities which constitute man's moral nature, under what may be termed epidemic influences. In speculating on the etiology of those wide-spread diseases or epidemics which affect the physical man, it is common to speak of a peculiar constitution of the atmosphere as a cause; but in what this peculiarity consists we are ignorant, as it is not appreciable by our senses, nor measurable by known instruments or tests. To suppose, with some writers, a conjoint action of earth and air,—an exchange of subtle agencies, electro-magnetic and what not,—by which the organism is affected in an abnormal manner, will not aid us in a solution of the problem. Can we go any farther in our study of the causation of moral epidemics? The mystery may be lessened by our admitting that in them the diffused morbid agency or motive power spends its force on the nervous system,—the brain and senses, which are functionally deranged, just as in epidemic cholera the digestive apparatus, and in influenza the respiratory organs, are the chief sufferers. Still, we must content ourselves with a bare knowledge of the fact that mental resulting from cerebral excitement of a peculiar kind becomes epidemic. There is, however, much left for the medico-philosophical historian in collecting and arranging the details of the circumstances which preceded, accompanied, and immediately followed this moral disease, so far as they were manifested in the social, political, and religious movements of the people during the entire period. Due notice must be taken also of the physical influence of climate and seasons, and of the food and manner of living at the time. Some data of this kind have been contributed by Cæsar in his account of the Gauls and Batavians, and by Tacitus in his description of the Germans; but they fall short of explaining the impelling motives for the irruption at irregular intervals of those immense swarms from the northern hive, by which Rome in the time of the republic, and subsequently, with more disastrous results, under the empire, was assailed. In what a comparatively short period did the followers of Mohammed and the believers in the Koran propagate their faith and make themselves masters of Middle and Western Asia and Northern Africa! The epidemic wave spread itself over these countries with a force and speed not to be explained by the ordinary means of conquest and political combination, and it spent itself without being followed by another. Idolaters, Jews, nominal Christians, all succumbed to the mysterious power which, for a time, threatened to overrun Central Europe as it did Spain.

The most remarkable moral epidemic on record is that of the Crusades, in which Europe threw herself on Asia in a spirit of the wildest excitement and passion, commonly attributed to religious enthusiasm and fanaticism. But in reality it was an outbreak of mingled feelings, in which the love of change and adventure, a desire of the people, everywhere moving with slow and uncertain steps in the mists of ignorance and superstition, to escape from feudal tyranny and priestly domination and to revel in the storied riches of the East, was as influential in the minds of those who enlisted under the banner of the Cross as an eagerness to get possession of Jerusalem and to drive away the profane despoilers of the Holy Sepulchre. The preaching and exhortations of Peter the Hermit did indeed rouse into active display the religious zeal of those of knightly degree, as well as of others of elevated piety; but the response in seeming earnestness was also made by large numbers of crazy fanatics and wretches bent on rapine. Different from epidemic diseases in general, in which the poor, the destitute, and the profligate are the earliest victims, this moral epidemic spread from the higher classes to the lower, as might have been anticipated when we look at that part of the organism, the brain with its moral faculties, which would be the first to be called into activity by the appeals made and arguments used, and would also be more susceptible to such appeals in persons of intelligence and higher social rank than in the ignorant masses of the people. Fuller, in his quaint language, well describes the strange medley of adventurers who joined the crusading armies. Notwithstanding the disastrous results of the successive expeditions sent out to free the Holy Land from Mohammedan rule and tyranny, they served to exhaust for a time some of the impurities of the moral atmosphere, and brought back with them materials for advancing civilization. So we find that after ordinary epidemics—as, for example, cholera—there is often, for some time, a diminution of the death-rate from current diseases.

Another memorable period of a moral epidemic was that of the Reformation, and the changes and commotions, social and political, and the wars with which it

was associated. Great was the agitation in men's minds, fierce and bloody the encounter between Catholic and Protestant rulers and people; and yet the epidemic influence did not the less expend itself before the expiration of the century in the first quarter of which it began, and the lines were drawn between the countries professing the two creeds, which have undergone little change since, notwithstanding the zeal and powerful machinery of both sects for making proselytes.

The first French Revolution—that of 1789—cannot be measured by any ordinary ethical and political standard. Its provocations have been fully and carefully recorded; but whether we look, in amazement, at the sudden upheaval of the entire frame-work of French society and institutions, the popular excitement marked by the wildest atrocities and the most heroic self-sacrifices, or the spread of republican fever to other parts of Europe, we cannot but regard the whole marvellous series of events as a great moral epidemic, the like of which can occur again only in a general subversion of the thrones of Europe and the establishment of republican governments in their stead.

The American Revolution and its war of independence cannot, we think, be looked at in the light of a moral epidemic: they were the determined assertion and defence of privileges previously enjoyed, and an extension of the right of self-government. Quite different was the war of attempted secession, which was the product of a violent moral epidemic,—a hostile and concerted outbreak of long-cherished and inherited feelings and prejudices, to repel what was believed to be a systematic attack on an institution which the people had always regarded with peculiar favor, as a source of power, a producer of wealth, and a supporter of class privileges. Nor were they less passionately earnest in sustaining it, in face of the adverse sentiments of the greater part of the civilized world. The future historian cannot fully describe this war unless he embrace in his picture its striking features of moral commotion, as well as the physical disorders to which this commotion gave rise.

At the present time, in the war between France and Prussia, we see the melancholy and destructive effects of a moral epidemic of national hatred and revenge, which only wanted an exciting cause, were it ever so trivial, to bring grief and wailing and enormous losses of life and treasure to the inhabitants of both countries, —the conquering and the conquered alike. The French people had been long taught to believe that they were bound, at the first opportunity, to retort on the Prussians for the defeats and indignities inflicted on them by the latter in the campaigns of 1814 and 1815, forgetting all the while that in previous years the French armies had overrun Prussia, occupied its capital, and treated it as a conquered province. Both nations might, in fact, have cried quits, and buried all their animosities. But this morbid predisposition of the public mind, in place of being soothed by lessons of peace and forbearance, was played upon by orators, journalists, and publicists, who would make patriotism consist in hatred of the people of other countries rather than in love for their own. Ambitious longings of the French were also encouraged by the same bad advisers for the restoration of the former boundary of the Rhine between France and Germany, and the consequent reacquisition of territory by the former. It was, therefore, an easy thing for the Emperor Napoleon, instead of allaying these angry and disturbing impulses, to give them concentration and hostile direction, and to plunge the French nation into a war with Prussia, contrary to all the dictates of justice and honor. The moral epidemic, so long impending, has broken out with fearful violence, and the people and armies of the two countries have been, for many months, under a pestilence-working cloud worse than any that ever shed its malign cholera influence on the inhabitants of the earth beneath.

A clear lesson, deducible from our brief notice of moral epidemics,—the principal ones only of which we have mentioned,—is the necessity of an enlargement of the sphere of duties of the philosophic physician, a true follower of Hippocrates, the moralist, the preacher, and the statesman, which would require their constant watching of the public mind, and applying correctives to national prejudices and hatreds while these are yet in their formative state. Dehortations against war and its concomitants, rapine and cruelty, must always be commended; but of still greater moment should be the discouragements held forth against the nursing of prejudices and an extreme sensitiveness to imaginary insults under the workings of which a people sometimes snatch at an excuse for war. It cannot be expected that the whole population of a country should be put under a cooling regimen, and lose a little blood from the arm, for the purpose of reducing the national fever; but derivatives might be usefully employed which would turn public excitement into the walks of peaceful ambition, by the cultivation of the arts and sciences, and the erection of public works, useful and commemorative. At any rate, it would be very desirable for rulers of the state and other members of the government—legislators, and especially political orators and agitators—to submit themselves, in seasons of threatened moral epidemics, to a dietetic course, in which artificial stimulants, and particularly whiskey, should find no place. Voltaire wittily said that wars have been brought on because a minister of state could not procure a stool. Some years back, at a time when the question of boundary between the United States and Canada was warmly discussed, a war speech which alarmed the whole country was made in Congress by an eminent political leader and orator, who was intoxicated at the time.

The subject is fruitful in suggestions for a higher standard of public morals and a better-understood code of international ethics. The pen and the pulpit must work together for a thorough indoctrination of the people in the same line. By these means moral epidemics would be either prevented, or, occurring, would lose much of their virulence.

OPEN DOORS.

"Shut the door after you,
And you'll never be chid."

WE have nearly all of us in our younger days heard the old rhyme the last verse of which heads our article; and, however much we may have been obliged to obey the moral teachings of the first verse, the second was no less strenuously insisted on by our elders. The first, or at least its sense, antedates, in all probability, the creation of doors; but the latter sprang up, we doubt not, when immense fireplaces and huge chimneys were chiefly means for the consumption of fuel, and served but little purpose as heat-giving agents. At that time, when passages freely communicating with the outer air lay just outside each room, no doubt the opening of the door added greatly to the discomfort of those whom the room contained; and, as ventilation was already well secured, there was good reason for complaint if any among the younger members of the household forgot to see that the latch closed fairly upon his impetuous footsteps.

Much later than those days even, and within the memory of many of our readers, when ventilation was secured by the open fireplace, and when the labors of Franklin and his cotemporaries had succeeded to a great extent in causing a large proportion of the heat from the fire to influence the temperature of the rooms, the entries were still cold, as indeed the sleeping-rooms were apt to be,—bitter cold; and it was still of great and real importance that those apartments in which the day's work was to be accomplished should be kept at a proper standard,—a result impossible to be reached unless the prescription of our old stanza was insisted upon. But now—we have of course a complaint to make—all that is changed, partly for the better, but we fear, also, for the worse, to a great degree.

While in our early days the constant transitions from moderately warm rooms to very cold entries were, no doubt, a strain upon the weaker ones, this, to a certain extent, must have been combated by the free ventilation which the fine old fires with gum back-log and hickory back-stick under the wide-throated chimneys enabled us to have. To help matters, too, the Knott stove came in, and the entries grew perceptibly warmer. So the old saw held its own, and did no harm.

Now, on the contrary, we believe it does great harm. To obey those in authority is an excellent—a most excellent—lesson for us all to learn; but we have no longer faith in our versicle as a whole, and for this reason.

Most of our houses—or at least a large proportion of them—are heated by a furnace, even if all the warmth is not derived from one. Open fireplaces, it seems to us, are becoming rarer and more rare, and with them disappears a most efficient means of ventilation. We will not stop here to lament this as a great loss to us in a social point of view, this depriving the family of the *focus* to which its various members may come,—the hearthstone, so dear to all who have had a real one,—though we believe it to be a great loss; but we will urge it as a reason for throwing open more freely the doors of communication between entries and rooms. Since furnaces have been so generally introduced, entries and passages can be, and are, kept much warmer than was possible before,—quite warm enough, if not indeed too warm, for health,—and there need no longer be the risk of unduly lowering the temperature of the rooms in which we live, by leaving the door open behind us. Besides, windows shut closer, and, as towns increase in size, the outer cold has less effect upon in-door temperature; and, what is of far greater moment, ventilation, in too many modern houses, must be secured through the entries, or not at all. Fresh air, it is true, is poured into the rooms from the furnace, but egress for that which is vitiated is not provided, and it must pour out through cracks, or remain. Of course, if we could wait it would pour out. Fresh hot air coming in would gradually completely purify the room, which would attain a temperature of over 100° F. But we cannot stand it: so we shut the register, and put an end to ventilation and temporary discomfort together. Very few houses, however, have means for throwing as much hot air into their entries as into the rooms, so that not only are the latter filled with vitiated air, but actually, in spite of all the modern improvements, the entries grow cold; more coal is thrown on the furnace, its upper door is shut, and very little is effected.

Now, if we would only accustom ourselves to open doors, we would certainly have better ventilation in the rooms, and warmer entries, while both rooms and entries might be kept at a temperature of 68° with much less trouble than is now expended in bringing rooms "up to 70°."

Where there are children, it is, we think, of great importance that rooms and entries should be of the same temperature, for certainly a large proportion of the chest and bowel affections of the young can be traced among certain classes to an exposure to a change in temperature, especially where the little ones are in the habit of passing from overwarmed rooms into somewhat underwarmed entries.

There is no need to dilate on the necessity of ventilation to young and old; but even where stoves are used, and a certain ventilation is thus afforded, our remarks hold true, for there is no doubt that all ordinary modes of burning anthracite coal pour into our rooms so much of the inodorous, tasteless, poisonous carbonic oxide, that we can hardly have too much air with which to dilute it.

So we put in a plea that instruction be given to our young folks somewhat different from that which their forefathers received. Teach them by all means to be obedient and docile, but forgive them if doors be left ajar; nay, more,—teach them to leave them open.

HONORS TO MEDICAL MEN.—Dr. Sigmund, well known as a syphilographer, and Dr. Hermann Beigel, the laryngoscopist, have been honored with the order of the Iron Cross. Of the latter it is said that decoration was bestowed for personal bravery on the field of battle.

CORRESPONDENCE.

MICROSCOPICAL MEMORANDA.

BY DR. NEWLENZ.

AT the close of the late war, having been brevetted lieutenant-colonel, through the untiring efforts of the member from my district, and being therefore desirous of contributing to the reputation and usefulness of some of the learned societies, I applied for admission to the Royal Microscopical Society, among others. National jealousy, probably, caused the rejection of my application, and the result was that I formed a society myself. This society has devoted itself exclusively and earnestly to histology, pathology, test-objects, the cryptogamic origin of disease, spontaneous generation, germinal matter, bacteria, and cells* in general.

Having constructed a one-seventieth immersion objective, on a new principle, having 191° aperture,—the immersion liquid being fluoric acid,—and, for illumination, having invented a new eccentric parallelopiped, to be used with fluorescent rays exclusively, some remarkable results have been obtained.

I take great pleasure in stating that, with regard to test-objects, all previous observers have been totally wrong in every particular, and that *Pleurosigma angulatum* is, in the first place, constructed on the plan of the Nicholson pavement, and, in the second place, that it is not a Pleurosigma at all.

The most certain test-object is the *Newlenzia difficilissima*, a very rare and remarkable diatom, in which my one-seventieth with the parallelopiped shows four kinds of beads and six sets of cross-lines, one of which sets contains 147,229,073 lines to the inch: hence, by the well-known formula of Brewster, $\frac{d \cdot x}{d \cdot u} = \sqrt{o \cdot x \cdot p \cdot y}$, it is impossible that the undulations of light should pass without being previously deflagrated, and therefore no other lens can possibly show these lines, nor is it probable that this lens would with any other observer. The immense superiority of this test to Nobert's plate is apparent.

Reserving this topic for future discussion, I have a few words to say with regard to spontaneous generation and cryptogams. With regard to the former, the true theory was declared in 1740, in "Lucina sine Concubitu,"—a most valuable and rare work, which seems to have been overlooked by recent writers on this subject. The author, starting from the proposition of the ancient philosophers, "Non potest reperiri avesne vel ante ova generata sint, cum et ovum sine avi, et avis sine ovo gigni non possit," proceeds thus: "Je n'hésitai donc plus à regarder ce vent . . . comme le véhicule propre pour ces embrions flottans. . . . Sur ces principes, je vins à bout de fabriquer une machine,—*Cilindrico-catoptrico-rotundo-concavo-convex*. . . . Cette machine fut lutée hermétiquement d'une terre électrisée, et je le plaçai dans une position convenable vers l'Occident pour intercepter les animalcules flottans dans cette partie prolifique du ciel. . . . Je découvris clairement que ces germes étoient des petites femmes et des petits hommes exacts dans leurs membres."

It will be seen that the machine above referred to prefigured the aeroscope of Pouchet, the isolation apparatus of Hallier, and several other modern inventions. One American and one English observer seem to have entered fully into the spirit of the above-mentioned work; and I desire to offer to them the assurance of my unbounded admiration for the power of their faith and the vigor of their imagination.

The following experiments, conceived in the spirit of their method, will be found interesting:

Exp. 1.—A glass flask was filled with ditch-water, and boiled three days in a Papin's digester, under a pressure of four atmospheres. After a week it was opened, and in the first drop of the contents was found the remarkable animal shown in the accompanying sketch.†

Bacteria were abundant.

Exp. 2.—Some of the fluid contents of an ovarian tumor (a remarkable case, removed by myself through the perineum, of which I shall give a full account in my report to the American Medical Association on Perineotomy) was examined by fluorescent light. It was full of spontaneously-generated corpuscles, starch-fibres, and cotton granules, with many invisible germs.

Exp. 3.—Two ounces of water, containing, among other things, *Gemiasma*, *Euglena*, *Podura nivalis*, *Micrococcus*, *Cryptococcus*, *Arthrococcus*, and an entirely new and original coccus,—viz., *Newlenziacoccus*,—were drunk, by mistake, by a friend of the author. For twenty-four hours he was afflicted with a conglomerated epidemic which presented nearly every symptom described in Da Costa's Manual. Cryptogamismus is the only appropriate term for his condition.

My most remarkable discoveries, however, have been in the blood. Space is wanting to enumerate here the many forms of Coccus, Algæ, and Rhizopods that I have found in the blood, *when the proper conditions of observation were afforded.*

I can only say here, in conclusion, to the numerous persons who have written to me on this subject, that a minute investigation with the one-seventieth and the parallelopiped requires much labor. I always give at least an hour to each specimen; and, as I have had to examine over twenty thousand specimens within the last year, I am compelled to state that, in future, unless fifty dollars are sent with the drop of blood on which I am to furnish diagnosis and treatment, I shall not notice it.

IMMERSION HALL, February 2, 1870.

NOTE FROM DR. J. G. RICHARDSON.

TO THE EDITOR OF THE TIMES.

DEAR SIR:—The rare candor and fairness which characterize your review of my paper "On the Cellular Structure of the Red Blood-Corpuscle," in the last number of the *Medical Times*, embolden me to trespass upon your valuable space. I desire to allude briefly to one of the minor points among my observations, which doubtless has been overlooked,—viz., that recorded on page 10, to the effect that blood-crystals of the menobranchus when partly dissolved could be seen to move rapidly, and as if with perfect freedom, in various directions, between the nuclei and external borders of certain corpuscles. This fact appears to my mind much more consistent with the hypothesis of a cell-wall enclosing fluid contents than with the doctrine of a homogeneous jelly-like constitution (Beale), or the theory of a crystalloid element "contained in an albuminous frame-work of paraglobulin" *firm enough to preserve the shape of the red disc* (Brücke, Stricker); and it

* *Sic*,—not sells.

† The sketch is necessarily omitted. It looks remarkably like *Pediculus capitis*.—ED.

seems to me the indication furnished by this circumstance resembles in kind the evidence which sudden dartings of a gold-fish across his vase would be that *he* was not imbedded in jelly or entangled within a net.

Fully recognizing, however, the wisdom of your caution against considering any one series of experiments (or, I may add, indeed, any one man's unaided observations, however numerous) as "conclusive proof," and trusting, therefore, that these researches will lead others to investigate the subject and correct or confirm my results,

I am, very respectfully, yours, etc.,

JOSEPH G. RICHARDSON.

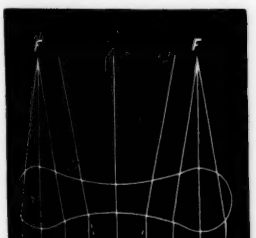
1620 CHESTNUT STREET, PHILADELPHIA.

TRANSACTIONS OF SOCIETIES.

BIOLOGICAL AND MICROSCOPICAL SECTION, ACADEMY OF NATURAL SCIENCES.

CONVERSATIONAL meeting, January 16, 1871, J. H. McQuillen, M.D., in the chair.

DR. TYSON asked the attention of the section to a simple diagram which he has been in the habit of using in his lectures for the purpose of impressing upon students the circumstances under which the reversal of lights and shadows takes place in red blood-corpuscles during microscopic examination. The familiar "cracker"-shape of the red corpuscle being acknowledged, it is plain that the *central* portion is a *double-concave* lens, while the periphery will act as a *double-convex* lens. The centre of the corpuscle will therefore cause the parallel rays *r, r, r* to disperse, and to pass beyond the corpuscle, diverging, as though coming from the negative focus *N*, which is the point to be focussed by the object-glass to make the centre bright. But to do this, the object-glass must approximate the corpuscle; hence it becomes "within the focus" for the entire corpuscle. But when this is the case, the periphery of the corpuscle is out of focus, and therefore dark, because, acting as a double-convex lens, it causes the parallel rays *r'*, *r'*, *r'* coming from the mirror to converge to a focus at the point *F*, above the corpuscle. Now, to make the periphery of the corpuscle appear bright, the point *F* must be focussed. But to focus this, the object-glass must be removed *from* the corpuscle, since the rays must again diverge before they can be made to form an image, and in so doing the object-glass is placed "beyond the focus." When this is the case, however, the centre is no longer in focus, and therefore appears dark, while the periphery is bright. In the opposite position, or when the objective is "within the focus," the *centre* is *bright* and the *periphery dark*.



This diagram can easily be carried in the mind's eye, and at once the facts can be thought out without burdening with their recollection the memory, which is here peculiarly apt to be treacherous. Indeed, the speaker said, he could never himself promptly recall the circumstances under which the centre had been bright and the periphery dark, and *vice versa*, until he had called to his aid this diagram. And that the exact truth is liable at least to escape attention, is seen in the circumstance that in a volume no less highly valued than the seventh edition of Carpenter's Human Physiology, 1869, is contained a misstatement of the facts. We find here, on page 200, the statement that the corpuscle is *rather beyond* the focus of the microscope when the *periphery* is *dark* and the *centre bright*, and *within the focus* in the opposite appearance,—that is, when the *centre* is *dark* and the *periphery bright*. The reverse is correct. In the last edition of Carpenter (1868) "On the Microscope," however, pages 166–167, we find the principle applied, and the fact correctly stated, though a few lines farther we find it asserted that the hexagonal areolæ in diatoms appear *dark* when the surface is slightly *beyond* the focus, though they are described as hexagonal *elevations*. If this latter be the case, then *they should appear dark when within the focus*, as is the case with the periphery of the corpuscle. So, too, on page 710 of this latter volume there is reproduced the same drawing referred to in the text-book on physiology, but with the description reversed, and therefore correct. The corpuscle is, however, described as in focus when the periphery is in focus, whereas we have presumed that the entire corpuscle is in focus when there is least shadow. Of the other text-books now within our reach, Dalton has it correctly on page 214 of his third edition; Flint, Kirke, Ranke in his "Grundzüge der Physiologie," and Rollett in Stricker's "Handbuch der Lehre von den Geweben," refer to the reversal of light and shadow, but do not state the circumstances under which it takes place; Marshall makes no allusion to it.

MR. HUMPHREYS wished to know what was Dr. Tyson's opinion as to whether the markings upon diatoms were convex or concave.

DR. TYSON stated that he could not speak from personal knowledge as to the facts, but believed that Dr. Carpenter's view as above stated was most generally received.

DR. MCQUILLEN exhibited five microscopical specimens, prepared by Dr. George D. Harriman, of Boston. They included sections of bone and of the dentine and cementum of teeth. All had been acted upon by dilute muriatic acid, removing the earthy salts and leaving the organic basis of which those structures are composed, and were finally stained by carmine. These specimens had been prepared by Dr. H. with a view of demonstrating that dentine does not consist of tubular and intertubular structure; also, that in cementum and bone the lacunæ and canaliculi are not empty spaces, but occupied by a soft, solid substance.

JOSEPH G. RICHARDSON, *Recorder*.

REPORT OF THE PROCEEDINGS OF THE PATHOLOGICAL SOCIETY.

AT a meeting of the Pathological Society, held Thursday, January 12, 1871, John Ashhurst, Jr., M.D., in the chair, Dr. R. M. TOWNSEND presented a *tumor of the upper third of the humerus*, removed from a subject in the dissecting-room. The mass accurately adapted itself to the space between the acromion and the coracoid processes of the glenoid fossa of the scapula, and then expanded into an ovoidal tumor which covered the upper third of the humerus. The subject from whom the specimen was procured showed marked deformity of the thorax, with flattening of the head of the left femur and displacement backward upon the dorsum of the ilium. The tumor was firm in consistence, and to the eye resembled a mass of suet. On section, the roughened end of the humerus was seen perforating the lower portion of the mass; a section of the outer portion resembled a section of the corpus striatum or medulla oblongata. Of the head of the humerus nothing was left but a shell.

The specimen was referred to the Committee on Morbid Growths, who reported (January 26) that it presented the elements of a well-marked cancer. Sections from the periphery show the well-known characteristics of schirrus,—viz., a dense network of fibrous tissue, into the interspaces of which are crowded small, irregularly-shaped, nucleated cells of epithelioid habitus. In the interior of the growth, in the space formerly occupied by the marrow of the bone, is a soft granular

mass, exhibiting beneath the microscope large epithelioid cells, among which were interspersed numerous mother or giant cells.

DR. S. WEIR MITCHELL exhibited the *sciatic nerve of a rabbit, in the sheath of which were developed, after irritation, multiple abscesses.*

The rabbit, a female, was inoculated with hydrophobic saliva in October, 1869. June 27, 1870, the right sciatic nerve was exposed and frozen by a rhigolene jet several times. June 28 this was repeated. These operations were followed in each instance by loss of power for a day or two, when the limb recovered its full force. By July 13 the whole of the hair on the right hind leg fell off by degrees. At this time sensation and motion were normal. September 12, hair nearly all replaced. A loose ligature was carried around the left sciatic nerve. Within a week there was increasing loss of power, and at length total palsy. The ligature came away between September 29 and October 12, and the wound healed readily. During the winter this rabbit became paraplegic, and was killed and examined two weeks ago by Dr. Wharton Sinkler.

Dr. W. W. Keen studied the condition of the nerves, which I have verified. The right sciatic is healthy, and has no trace of the congestion caused by freezing. The right side of the spine was, however, congested in spots, and for some lines is altered in color, being gray and semi-transparent,—probably affected with sclerosis. The left nerve is traced on to a large tumor, over which its fibres spreading are lost. To this succeed other masses, and close to the point of exit from the spine we see on these masses the nerve-fibres, which spread over it on emerging from the spine. Between the first and the remotest of these growths the nerve could be seen at two points between two of the tumors, but elsewhere it was lost to view.

All of the nerve-fibres were in a state of profound alteration, and the axis cylinder tube was not merely constricted at points, but was in places enormously dilated by what seemed to be enlargements of the axis cylinder. I have never seen elsewhere this remarkable appearance.

The masses in question the doctor presumed to be a form of neuroma. They are fibrous sacs, containing the whitish-yellow granular and molecular cheesy substance, with rare corpuscles, which in the rabbit represents pus. They were certainly developed in the nerve-sheath. In hundreds of experiments on nerves he has met with no such occurrence, and has rarely been able to cause neuritis, which in man is probably much more common.

Thursday, January 26, 1871.—The President, John Ashhurst, M.D., in the chair.

DR. C. B. NANCREDE presented, for Dr. Geo. A. Rex, *a double ovarian tumor*, removed post-mortem from a woman aged fifty-three years, whose mother is also said to have perished with an ovarian tumor. The patient first noticed a tumor in the left ovarian region about the time of the cessation of her menses, eight years ago. The tumor steadily increased in size, and has been accompanied at intervals with more or less ascites. The tumor appeared on the right side.

On January 18 the operation of paracentesis abdominis was performed by Dr. H. Lenox Hodge, with a view of affording relief and aiding a diagnosis, when three gallons of a dark bloody serum were removed. Though relieved by the operation, she gradually sank, and died January 25. The tumors were removed thirty-eight hours after death.

The specimens were referred to a special committee, consisting of Drs. W. W. Keen, W. F. Norris, J. Ewing Mears, and W. F. Jenks, who reported, February 9, as follows:

"The specimen consisted of the uterus, both ovaries, and a part of the bladder. It resembled very much a pair of saddle-bags, the uterus being the thick connecting band between the two large ovaries.

"The muscular wall of the bladder was thickened, and the mucous membrane reticulated from bands of hypertrophied muscular tissue underneath it.

"The uterus was dragged up by the left tumor, was partly spread out on its surface, and partly formed the thick, short band connecting the two tumors. Its canal was 3½ inches long. On opening it, a small polyp, somewhat larger than a pea, was found on its posterior wall, and a small intra-mural tumor existed to the right. The two Fallopian tubes were perfectly easily followed on to the tumors. The left one was flat and ribbon-like, about of the normal calibre, except at its entrance into the uterus, where it was considerably dilated. The right tube was quite small at its uterine extremity, but soon dilated into a long, thin-walled, dark-colored cyst, about a half-inch in diameter at its largest part. The fluid contents of the cyst were slightly brownish, and exhibited a few compound granule-corpuscles and epithelial cells undergoing fatty degeneration, with a little granular débris.

"The two ovaries measured in their longest (perpendicular) circumference, respectively, the right 28½ inches, the left 22 inches, and in their transverse circumference the right 19 inches, the left 22 inches. They were multilocular, and lobulated by numerous and tolerably large endogenous cysts. These cysts formed the main mass of the tumors. In front of the right tumor were some exogenous cysts. The most noticeable feature, however, were a series of apparently condylomatous growths or fringes, which were attached especially at the right lower corner of the right ovary and the two upper corners of the left ovary. These consisted of chains of small hard masses, of sizes from a pin's head to a chestnut, attached to the tumor sometimes only at one end, sometimes growing in masses from it. They were generally of a yellowish-white color, though one or two of the masses were reddish and flesh-like. All were exceedingly hard, and to the finger resembled cartilage. At one point some calcareous matter had been deposited. When a section was made through these masses for purposes of microscopic examination, it was found that they consisted of quite small cysts with very tough, thick walls, in every instance. The contents of the cysts were of the same character as the ordinary ovarian fluid,—viz., compound granular corpuscles, small round cells in fatty degeneration, and granular débris. No cholesterine was found. The lining membrane of the cysts was coated over with small, round epithelial cells, and in one instance we found cylindroid ciliated epithelium. The walls of these cysts consisted of dense fibrous and connective tissue, whose nuclei were plainly visible. Intermingled with these at some points were small collections of round cells, of no determinate character, which we judged to be the beginnings of proliferation of the connective-tissue corpuscles, and probably of new cystic formations. Of cartilage we were never quite certain that we had any positive evidence.

"The contents of the large ovarian cysts presented the usual characteristics.

"The condylomatous growths or fringes it is impossible to consider as cysts which have grown up from within by inclusion, as a result of the fusion of various neighboring dendritic outgrowths, but rather as small cysts developed in the neighboring connective tissue in the vicinity of the tumor, which itself may have acted as a centre of irritation. They have been subjected to friction, pressure, etc., and thus their walls have become dense and thick."

Signed by the committee.

REVIEWS AND BOOK NOTICES.

MEDICO-CHIRURGICAL TRANSACTIONS. Published by the Royal Medical and Chirurgical Society of London. Second Series. Vol. LIII. 8vo, pp. lx., 305. London: Longmans, Green, Reader & Dyer, 1870.

(Concluded from page 183.)

We shall next invite attention to the medical papers.

Experiments on the Action of Certain Diuretics on the Urine in Health. By F. B. NUNNELEY, M.D., Lond., Assistant Physician to the Victoria Park Hospital. Communicated by JOHN ERIC ERICHSEN, Esq.—Dr. Nunneley's experiments

were made upon himself, and with the following diuretics,—citrate and acetate of potassa, sweet spirit of nitre, and oil of juniper,—for the purpose of ascertaining their influence on the water, urea, and solids of the urine in health.

If these substances are found to act as diuretics in health, they probably act by themselves on the kidney; but if, on the other hand, they do not possess this power, their diuretic power in some diseases attended by anasarca is probably owing in part, at least, to the *changed* condition of the blood and of the whole secreting structure of the kidneys comprised in the idea of disease. The conditions of diet and exercise observed in each set of experiments were of course precisely the same. The urine was tested daily, not merely at the time when the medicines were being taken, but also before and after this period. The experiments resulted as follows:

Citrate and acetate of potassa and nitrous ether actually reduce the urinary solids, while they slightly increase the water; and oil of juniper increases the solids, while it slightly lessens the water. These results show that the action of these medicines (with the exception of oil of juniper) as diuretics in health is very uncertain.

On the Anatomy of a Case of Molluscum Fibrosum. By C. HILTON FAGGE, M.D.—The conclusions arrived at, not only by Dr. Fagge, but also by Mr. Howse, as to the nature and seat of Molluscum fibrosum, are as follows:

1. That each tumor is originally developed round a hair-follicle, enclosing at the same time the sebaceous glands belonging to the follicle.

2. That the smaller tumors consist of two distinct elements,—a central glandular body, itself surrounding a hair, and a peripheral mass of very fine connective tissue, containing numerous minute oval nuclei.

3. That the glandular body is a sebaceous gland, enlarged by the separation of its sacculi from one another, and perhaps also by the actual multiplication and increase in size of the sacculi themselves.

4. That the peripheral mass of nucleated connective tissue is developed from the two external layers of the dermal coat of the hair-follicle and sebaceous glands.

These views, if they should prove to be applicable to all cases presenting similar characters, have the advantage of reconciling to a great extent the discrepancies in the opinions maintained by previous writers. Indeed, the observations of Förster, who, in common with many of his countrymen, regards the disease as consisting simply in the development of scattered fibrous tumors indifferently among the layers of the cutis, are the only ones which Dr. Fagge regards as absolutely opposed to his own. A colored plate accompanies this paper.

On Certain Morbid Changes in the Nervous System, associated with Diabetes. By W. HOWSHIP DICKINSON, M.D., etc. etc.—This paper contains the description of the post-mortem appearances in seven cases of diabetes, which may be condensed as follows:

Peculiar morbid changes were constantly found in the cerebro-spinal system. These were, in all the cases, of the same nature, and in all occupied a similar situation. The earliest alterations recognized consisted in a dilatation of the blood-vessels, particularly of the arteries, with accumulation and frequent extravasation of their contents. The next was a degeneration of the nervous matter immediately surrounding the vessels; and this degenerative process occasioned excavation of tissue, cavities being thus produced which were often large enough to be striking objects even without the microscope. As to their situations, the changes occurred in constant association with the arteries. They were found in every part of the spinal cord and encephalon, attaining their greatest development in the medulla oblongata and pons varolii.

In the cord, the most conspicuous change was the enlargement of the central canal, probably connected with degeneration of tissue, of which many evidences were found there and elsewhere. The nerve-cells of the brain and cord were generally perfect. Such parts of the sympathetic system as were examined—namely, the upper cervical and semilunar ganglia—were apparently natural. The only constant change found in the viscera was epithelial accumulation in the liver and kidneys.

Although the discovery of Bernard, that puncture of a certain part of the medulla oblongata renders the urine saccharine, directed attention to the state of this portion of the nervous system in persons who have died of diabetes, yet neither in the medulla oblongata nor elsewhere have such constant lesions been found as to place the disease in question upon a sure pathological basis. These observations of Dr. Dickinson are therefore of great value. It is scarcely necessary to add that he regards the lesions of the nervous system as antecedent to the change of secretion. This paper is illustrated with two lithographic plates.

Anosmia, or Cases Illustrating the Physiology and Pathology of the Sense of Smell. By WILLIAM OGLE, M.D., etc. etc.—This paper, like the preceding one, is not only well written, but also of great value. In two of the first three cases that Dr. Ogle reports, the anosmia occurred in consequence of a blow upon the occiput, and in the only other recorded case of loss of smell in which the exact part struck is mentioned, the seat of the injury is the same. The anosmia in these cases is attributed to rupture of the olfactory nerves as they pass from the bulb through the holes in the ethmoid bone. A blow which is not sufficiently violent to do serious mischief to the anterior brain generally, may still suffice to tear the olfactory nerves, owing to their very small size, and still more owing to their excessive softness.

In the three cases the patients complained that they had lost taste as well as smell; but if we limit taste, as physiologically we are bound to do, to those sensations other than tactile which are communicated by means of the gustatory and the glosso-pharyngeal nerves, and which do not include the perception of aroma or flavor, then in each the taste was unimpaired, for there was no difficulty in recognizing either acid, bitter, sweet, or saline. Pure taste is limited to the perception of these few qualities, and any additional perceptions, other than tactile, which food may give us, are derived, not from taste, but from the much wider sense of smell, and are due to irritation of the olfactory nerves. It is shown very conclusively by Dr. Ogle that in some cases, which stand in apparent contradiction to the view here taken of the nature of flavor, the sense of smell is not lost, but defects in the accessory mechanism prevent its being exercised in one of the usual ways, while they do not prevent its being exercised in another. Dr. Ogle also cites cases which show that aphasia and anosmia are frequently associated. The explanation of this association he finds in the fact that the external root of the olfactory bulb can be traced to the floor of the fissure of Sylvius. In this class of cases the loss of smell is only partial, being confined to one nostril.

Dr. Ogle is strongly inclined to believe that the acuteness of smell is dependent upon the presence of pigment in the mucous membrane of the olfactory region. He proves satisfactorily that animals with dark skins, even when of the same species, have the sense of smell in a much higher degree than those with light skins; and the same is true of the different races of men. In explanation of this singular fact he says that the pigment is there to absorb the odorous emanations. In conclusion, he gives some good reasons for believing that pigment plays a part even in the reception of auditory impressions.

Report of the Committee appointed by the Royal Medical and Chirurgical Society to investigate Bain's and Pacini's Methods of Restoring Suspended Animation. Members of the Committee, W. S. SAVORY, F.R.S. (*Chairman*), I. B. SANDERSON, F.R.S., HENRY POWER, THOMAS P. PICK (*Secretary*), G. GASCOYEN (*ex-officio*).—Experiments were made by the committee upon four dead human bodies,—the whole number of observations being eighty-three. In order to ascertain the relative merits of the two methods referred to the committee, not only to each other, but also to other methods already in use, they were contrasted with the plan proposed by Dr. Silvester,—the three modes being employed alternately on the same subjects. In some of the experiments Dr. Silvester, and in others Dr. Bain, was the operator. The analysis of the experiments will show the relative advantages of the different methods:

	Number of experiments.	Average number of cubic inches inspired.	Average number of cubic inches expired.
Subject I.—			
Silvester,	9	22.0	21.9
Bain,	13	26.1	25.5
Pacini,	6	25.8	25.1
Subject II.—			
Silvester,	11	18.7	16.9
Bain,	10	23.5	23.3
Pacini,	9	7.4	8.5
Subject III.—			
Silvester,	6	19.4	12.5
Bain,	7	21.6	15.0
Subject IV.—			
Silvester,	6	35.0	13.3
Bain,	6	41.1	15.0

These results are decidedly in favor of Bain's method;* but the committee take occasion to say that "the method advocated and practised by Dr. Bain is but a modification of the plan usually known as Silvester's, and involves no new principle of action. It will be seen by reference to the table that in the amount of air introduced there is a greater difference when the same method is adopted with different bodies than there is between the two plans when practised upon the same body; this great difference being chiefly due to the size of the body, the amount of the mobility of the walls of the chest, and the rigidity of the muscles."

ON THE WASTING DISEASES OF CHILDREN. By EUSTACE SMITH, M.D., London. 8vo, pp. 196. Philadelphia, Henry C. Lea, 1871.

Diseases which are essentially chronic from their invasion, or become so during treatment, are seldom considered with sufficient minuteness in the ordinary text-books, being too often dismissed with the routine remark that tonics, a regulated diet, and, if possible, change of air, are indicated. It is, however, in the treatment of these diseases that the young practitioner feels the greatest need of advice. He can give the botanical description of every known variety of Peruvian bark, is familiar with the thousand-and-one preparations of the Materia Medica, has most probably armed himself with the well-tried formulæ of the schools, and yet at the outset of his career he finds himself called upon to treat some chronic infantile disorder, and is soon convinced, if imbued at all with modern skepticism as regards the action of drugs, that it is only by the most careful attention to the diet and hygienic condition of his patient that he can hope for ultimate success. If, at this juncture, this book of Dr. Smith's falls into his hands, he will indeed feel that he has "struck gold in the quartz," for the author, starting with the proposition that the amount of nourishment the child receives is not to be estimated by the quantity of food it takes, but by the amount assimilated, proceeds to the consideration of those abnormal conditions which result in malnutrition or "wasting." Simple atrophy from insufficient nourishment, chronic diarrhœa, and vomiting are first described; and this gives the writer an opportunity to develop most minutely and clearly his views on the hygienic diet of children in health and disease, maintaining that it is only by attention to these conditions that disease can be checked, the waste of tissue arrested, and the pale, emaciated, prematurely-old infant be transformed into the plump, rosy, hearty child, whose whole existence is but an expression of health. He urges, as do all modern authors, the necessity of the mother nursing her child; and though we would not weaken the effect of his argument by any word of ours, still it may be permitted, in a review, to dissent from the statement that "nursing prevents mammary abscess." On the contrary, abscess of the breast is exceedingly rare in women who are not nursing: for instance, we find that Winkel, in fifty cases of this disease, met with it only once in a woman who was not nursing her child; Edward Martin, of Berlin, in only eight cases out of one hundred and fifty under similar conditions; and we could greatly extend these statistics with the same result. Estimating so highly, then, the advantages which accrue to the child from receiving the nourishment designed for it by Nature, we are not surprised that the author recommends a return to the breast, or the adoption of a wet-nurse, in cases of atrophy, associated with diarrhœa, in infants who have either been recently weaned or who have been "brought up by hand." So strongly are the Continental authorities convinced of the necessity of this course, that they do not hesitate to say that without it treatment is in most cases futile. To quote only from Vogel (the best-known of the German authorities on the diseases of children), when speaking of this condition, he says, "There is only one remedy,—viz., the mother's breast: when the circumstances of the patient are such that a wet-nurse cannot be procured, the prognosis is *fere lethalis*." In speaking of the use of cod-liver oil in the after-treatment, the author lays great stress—and justly, too, as it seems to us—on the importance of inspecting the evacuations to see whether the amount given is digested, and insists upon the necessity of diminishing the dose until the medicine is no longer found in the discharges.

Here a few words of general criticism may not be amiss upon the manner in which the entire subject is dealt with by the author. It is evident that Dr. Smith is under the influence of the French school of teaching. Mere symptoms, as such, are given with the greatest profuseness, without a sufficiently careful analysis and reference of the individual phenomena to the various physical and pathological conditions which have produced them; and hence the pictures of disease are wanting in clearness, and the outlines are indistinct, passing the one into the other. We would not be understood as advocating lecture-room descriptions of disease, such as are seldom met with in practice, but rather as urging the *attempt* to unravel the complex group of symptoms, associating each with its corresponding pathological cause. It is, however, in this very point—viz., accuracy in the description of pathological processes—that the author chiefly fails; and, did space permit, we would gladly pass in review the pathology of rachitis and chronic diarrhœa as given by Dr. Smith. To prove, however, that this criticism is not wholly uncalled-for, let us take up more in detail the chapter on tuberculosis, which is perhaps one of the most interesting in the book. The author states that he has endeavored to utilize recent views on the subject of phthisis, but has limited himself to matters of practical importance. The labors of Virchow, Niemeyer, and Buhl in this field have, perhaps, more than any other scientific discussion in the last twenty years,—and we say this advisedly,—produced results of the deepest *practical* significance; and, if well understood, the deductions made from these theories are unanswerable. In stating these new views, however, there must be a precision of expression, a clearness in the use of terms, a freedom from ambiguity, which have never been demanded before. A single misapplication of the word "tubercular" will hopelessly confuse a whole argument. The author has, we think, failed to grasp the points which are essential to a clear development of this subject; and hence, while adopting the new theories as regards tuberculosis, he constantly misapplies terms, so that the whole chapter is wanting in clearness and force. For instance, the tenth chapter is headed "Tuberculosis of Glands," while the description which follows evidently has reference to the ordinary scrofulous degeneration of the glands of the neck, thorax, and abdomen. Undoubtedly these lymphatics may be the seat of tubercular degeneration; but here the process is entirely different, although the result may be and often is the same,—viz., cheesy degeneration. To speak more definitely, let us consider for one moment the scrofulous degeneration of these glands. The process is one of irritative hypertrophy, consisting of a multiplication of the pre-existing cells of the gland-structure, and is, in one word, a *hyperplastic* process. The product of this irritation may subsequently undergo cheesy degeneration, liquefy into a purulent fluid, or become calcified. When, on the other hand, we have to do with true tubercle, the process is *heteroplastic* in its nature, consisting of the production of cells precisely similar to those produced in scrofulous degeneration,—viz., the so-called "embryonic" or "indifferent" cells,—but owing their origin not to the prolifera-

* "The patient being laid on his back on a table, if convenient, the mouth and nostrils are to be wiped dry, the clothes, from the upper part of the body at least, having been removed. The operator stands at the head of the patient, placing the fingers of each hand in the axilla in their front aspect, with the thumbs on the clavicles, and pulls the shoulders horizontally towards him with a certain degree of power. Upon relaxing his pull, the shoulders and chest return to their original state."

tion of the pre-existing lymphoid cells which fill up the alveoli of the gland, but to the rapid division of the *proliferating* connective-tissue cells which form the trabeculæ of the organ, resulting in the infiltration of this tissue with masses of lymphoid cells. In the first case there is simple hypertrophy; in the second there is the development of a neoplastic growth. This, too, may be converted into cheesy material, and hence it is only in the initial stage that we can distinguish these two processes. There are also other points on which Virchow lays great stress,—viz.: in scrofula there exists a certain "vulnerability" of the part,—that is, a susceptibility to the action of irritants which would normally fail to produce any effect; for example, a slight angina, a bronchial catarrh, an eczematous eruption of the scalp, is followed by an irritative swelling of the neighboring group of lymphatic glands; and this process once excited is characterized—and here is the second element in the formation of the scrofulous diathesis—by great "pertinacity" in its continuance, by an inability to return to its original normal condition, by a want, as it were, of recuperative power. The explanation of this peculiarity, Virchow is constrained to seek in a certain imperfect development of the structure of the organ, or congenital *weakness* of the part, this constituting the "predisposition." This predisposition does not, however, argue the necessary development of scrofula, if the irritant which calls it into action is wanting. If tried by these tests, it is plain that Dr. Smith's chapter on "Tubercularization of the Glands" has reference only to their scrofulous degeneration; and here we may remark that, curiously enough, in his description of the *tuberculosis* of glands, he has transferred the description of *scrofulosis* of the lymphatic glands as given by Virchow in *contradistinction* to tuberculosis. This error can only be explained by the fact that, apparently, the author has not had access to the original, the passage being quoted from some lectures given by Mr. Southey. As, however, true tubercle may, and undoubtedly does, originate from the conveyance into the system of these products of scrofulous degeneration, the importance of arresting the conditions which act as the irritant and produce these changes in the lymphatic glands cannot be overestimated. Eruptive diseases of the scalp, an attack of bronchitis or enteritis, acquire a new and most serious import when occurring in a child born with this diminished power of resistance to all such irritants, and demand, on the part of the practitioner intrusted with the care of such a patient, a full and just appreciation of their possible results. The day has passed by when we hesitate about "driving in too rapidly an eruption on the scalp;" unfortunately, as Hebra sadly writes, "up to this time we have never succeeded in curing a chronic disease of the skin suddenly, or even within a brief space of time." The day has not, however, as yet come when the profession at large appreciate the necessity of treating with the most conscientious care all bronchial or enteric disease, however slight, when occurring in a child with a hereditary predisposition to scrofula; and we wish that somewhat more stress had been laid upon this point by Dr. Smith, who dismisses it in a short paragraph, failing to realize, apparently, the great importance of the subject. In treating of pulmonary phthisis, we find again the same mingling of old and new,—the same misapplication of terms. The diagnosis of true tubercle in the lungs is one of extreme difficulty, and the sources of error are too numerous to be even mentioned in the brief limits of a book-review. Suffice it to say that, in our judgment, various conditions have been confounded by the author while attempting this task. For instance, the description given on page 185 as occurring in a rickety child is not that of disseminated true tubercle, but of peribronchitis, with the bronchial tubes filled with the retained secretions.

The chapter on Infantile Syphilis is an admirable résumé of the latest views on the subject, with the additional value of the concurrent testimony of the author as regards the beneficial results of the use of mercury in this disease, thus confirming the conclusions reached by Widerhofer and others in the Vienna hospitals, where the opportunity of solving therapeutical problems in connection with syphilis is unrivalled, owing to the absolute legal control which the hospital authorities exercise over the syphilitic patient and her offspring.

In conclusion, we can most conscientiously recommend the book to the profession, in the conviction that the careful study of the chapters on the hygienic and dietetic treatment of infantile diseases will be productive of the most valuable results.

We urge these considerations more positively because at the present time there is no question which is more anxiously studied, not only by professional men, but also by political economists and philanthropists, than that of the education and care of children in public institutions, and the means by which a more favorable result may be attained than has heretofore been possible.

GLEANINGS FROM OUR EXCHANGES.

NEUMANN'S THEORY OF THE DEVELOPMENT OF BLOOD-CORPUSCLES.*—The development of the blood is certainly one of the least understood physiological processes, and especially is this true of its cellular elements. The most diverse opinions have been held respecting the origin of the white cells, their transformation into the red, and the ultimate fate of the latter.

In the first place, the embryonal development of blood was regarded as the key to the mystery; and since in the embryo the development of red corpuscles takes place from the white or lymph cells, through the intermediate form of a colored nucleated cell, a similar process was assumed to take place in the adult body. Since, however, the intermediate form—a colored nucleated cell—could not be found in the blood of the adult organism, it was supposed by one party (Kölliker) either that these forms might exist in some part of the body not examined, or else that the absence of transitional forms was to be explained by the rapidity of the transformation. Another party gave up the theory of transformation of white into red corpuscles, and sought another mode of origin for the latter. Thus, according to Wharton Jones and Bennett, it was the nuclei of the lymph-cells which were transformed into the red corpuscles. According to H. Müller, the latter arose from a fusion of nucleus and cell in the smaller lymph-cells. Gerlach, Funke, and others believed in an endogenous formation of red corpuscles in larger cells, while Zimmermann had recourse to some entirely different elements of the blood itself. Since, however, none of the latter views could be satisfactorily established, the tendency has been to fall back upon the hypothesis of a formation of red corpuscles out of the white corpuscles of the blood itself. There is no greater unanimity of opinion respecting the ultimate fate of the red corpuscles, though, in spite of the doubts of Kölliker, it seems probable that there is a continual dying off and new production of these elements; and it has been thought that a greater or less power of resistance to the action of water is a sign of the age of particular corpuscles. The origin of the white corpuscles has been pretty generally assigned to the spleen and lymphatic glands, for which the abundance of those elements in the vessels leading from these glands is a weighty argument. It has, however, always been a matter of the greatest difficulty to determine in what part of the body the metamorphosis of the blood-corpuscles takes place. This process also has been referred to the spleen, and especially on the strength of two peculiar structures met with there,—(1) cells resembling the white blood-cells, but with a yellowish color; (2) cells said to contain red blood-corpuscles. The first form undoubtedly exists, as confirmed by Eales, in the rabbit's spleen, but loses in importance when compared with the more characteristic transitional forms observed by Neumann. The second form of cell at first excited great interest, but its occurrence is so very variable and uncertain that it is probably correct to regard it, with Virchow, as a more or less pathological structure.

It has also been supposed that the metamorphosis of blood-cells may take place in the liver, and this because the red corpuscles of the hepatic vein are thought to show, by their greater resistance to the action of water, that they are younger

*"Untersuchungen über die verschiedenen Theorien der Entwickelung der Blutkörperchen, besonders über die neueste, von Neumann." Inaugural Dissertation; von Charles W. Eales, M.B., Leipzig, 1870.

"Investigations on the Different Theories of the Development of the Blood-Corpuscles, and especially on the latest, that of Neumann." A Graduation-Thesis, by C. W. Eales. (Abstract by J. F. Payne, M.B.)—From the *Quarterly Journal of Microscopical Science*, January, 1871.

than those of the portal vein, which are not only swollen up, but completely destroyed, by the addition of water. There are also many crenated and withered red corpuscles to be seen in the portal vein, but very few in the hepatic. These facts, if they prove anything, rather tend to show that the corpuscles in the portal vein are old and worn out, than that those in the hepatic vein are new; and the well-known solvent power of the biliary acids for the red corpuscles makes it probable that these may be destroyed in the liver and help in the formation of bile. But there is no proof that any new corpuscles are formed in the liver.

This enumeration is sufficient to show that, as regards the adult organism, no single point in the development of blood-corpuscles is yet satisfactorily established. Even that for which the most cogent arguments may be brought forward—namely, the origin of white blood-cells in the spleen—has recently met with the renewed opposition of Henle, who suggests, however, no other theory in its stead.

Professor Neumann, of Königsberg, deserves the credit not only of having, more or less, overthrown the theories hitherto proposed of the development of the blood-corpuscles, but also of having successfully inaugurated investigations on this point which lead in an entirely new direction. He has pointed out, as Henle did, that the organs which have been up till now considered are comparatively unimportant, and has most successfully filled up the gap thus produced in microscopical anatomy by bringing the blood-changes into relation with a structure to which such a function has never been ascribed. Kölliker had, many years ago, with a sort of divination, expressed the opinion that the origin of the red blood-corpuscles from the white in the adult organism would never be demonstrated until nucleated colored cells should be discovered. It was reserved for Neumann not only to discover the long-sought cell, but also to establish, on several grounds, its character as a transitional form.

The views of Neumann are published in the *Archiv der Heilkunde*, vol. x. (1869) p. 68 *et seq.*, under the title, "The Significance of the Marrow of Bones in the Formation of Blood." He there lays down two propositions:

1. There takes place in the vessels of the bone-marrow, favored by a considerable retardation of the blood-current, a transformation of abundantly-accumulated white cells into red.

2. A continuous passage of medullary cells into the vessels contributes to this accumulation of white cells in the blood-vessels of the marrow.

This whole theory, for which a considerable number of more or less reliable arguments can be urged, gains at once a large amount of probability from the discovery, first, of the colored nucleated cells, and, secondly, of a remarkable accumulation of lymph-cells in the marrow, in virtue of which the latter acquires an importance with regard to the formation of blood, not only equal to, but greater than, that formerly ascribed to the spleen. Other important arguments are, however, alleged. Neumann has found, besides those nucleated and colored cells which he regards as the true intermediate form between the white and the red corpuscles, other transitional forms which, on the one hand, form a passage from the white blood-cells to the red nucleated cells; on the other hand, from these to the red non-nucleated corpuscles.

Neumann meets the objection that these colored transitional cells may be merely lymph-corpuscles tinged with blood coloring-matter, by showing that their general character is quite different from that of lymph-cells, and, further, that they are limited to the osseous marrow. He accordingly compares them, as well as similar forms met with in the frog, to the nucleated red cells of the embryo.

The detailed description given by Neumann of the marrow refers especially to the marrow of the bones of rabbits, and he regards the existence of similar relations in the human body as a matter of probability rather than of certainty.

Eales also has found these minute structural characters of the marrow to hold good only in the case of rabbits, and has not succeeded in detecting them in the human body. This difference he regards as possibly explicable by the fact that the human structures examined were those of persons enfeebled by disease, and also that they were not examined till some hours after death. Besides that, the human marrow, even that of children, is very different in appearance, even to the naked eye, from that of young rabbits, which may often be separated completely from the surrounding bone, in the form of a red cylinder. The *a priori* probability that similar relations exist in the human marrow will, very possibly, be confirmed by researches conducted in some different method.

Eales also insists upon the fact admitted by Neumann, that the yellow fatty marrow which fills all the long bones in adults plays, at best, a very subordinate part in blood-formation; and that the observations must be understood to apply only to the red vascular marrow which is found in all bones in young animals, but in adults in the spongy bones only.

This structure is minutely described by Neumann, whose account is confirmed in the main by Eales. It consists of a remarkably developed capillary network, and of a special tissue, called by Neumann the medullary tissue, contained in the meshes of this network. The capillaries have this peculiarity, that their calibre is much greater than—on the average, four times as great as—that of the small arterial branches immediately supplying them, and this sudden enlargement of the blood-channel must cause a considerable diminution in the velocity of the blood. The capillary network is also very close, its meshes being only about half again as large, or less than twice as large, as the diameter of the capillaries. Within these vessels, especially in the wider portions, is seen a great accumulation of white cells, as well as "transitional forms" in variable proportion, and it is these which especially mark out the locality as the seat of blood metamorphosis. The tissue contained in the meshes of the vascular network consists of a stroma of delicate stellate cells, anastomosing by means of fine prolongations, and thus forming a reticulation within which are contained, in the red marrow, a large number of lymphoid cells; but these do not occur in the yellow marrow. To this tissue Neumann gives the name of *medullary tissue;* and to the red form, *lymphoid medullary tissue;* it bears most resemblance to the cytogenous connective tissue of Kölliker, or adenoid tissue of His. The yellow matter, being without lymphoid cells, and having its anastomosing cells filled with fat, resembles ordinary adipose tissue. Since it is precisely in the red marrow, with its numerous lymphoid cells, that an accumulation of white or lymphoid cells is seen within the blood-vessels, the question at once arises, What is the connection between these facts? Are the lymphoid cells in the blood derived from those in the medullary tissue, or *vice versa?* Neumann supposes that the lymphoidal cells of the blood are formed in the medullary tissue, and find their way into the vessels by a process of immigration similar to, but the converse of, that of emigration observed by Cohnheim; though, of course, not in this case susceptible of direct observation. The difference is, however, very considerable between a cell finding its way out of a vessel in the direction of the blood-pressure, and into a vessel against the blood-pressure. In order to make it probable that the medullary cells do find their way into the vessels, it would be important to show that they exhibit amœboid movements. Neumann has observed that a small number only of the lymphoid cells pressed out of the medulla in a rapid investigation are without these movements, and concludes that it would be impossible to regard this small number as the only medullary cells; so that some of those showing amœboid movements must be medullary.

More important support is given to the theory by various facts which point to a multiplication of medullary cells, since these, as they must go somewhere, Neumann concludes must find their way into the vessels. He also draws attention to the variations in size of the medullary cells, laying down the proposition that great differences in the size of similar elements in a tissue must depend upon processes of growth going on in them. Moreover, he draws attention to the myeloid cells, or "*myeloplaxes*," found in the marrow of bones, which cells, according to Kölliker, arise from a proliferative increase of the small medullary cells, and finally divide again into a large number of small cells. If, then, according to Neumann, such a multiplication of small cells does really take place as these facts point to, there is no other exit for them than into the vessels; the nutritive changes in so stable a substance as bone being far too small to need so copious a supply of organizable material. The hypothesis of an *emigration* of white cells from the capillaries into the medullary tissue, and a con-

sequent accumulation of them here, is rejected by Neumann on the ground that a tissue, like the medulla, enclosed in a hard shell of bone, is especially unfavorable for the emigration of cells, and that it is difficult to see what would become of the emigrated white cells, their return to the vessels being improbable, and their exit through the very scanty or almost deficient lymphatics of bone being equally so.

An unprejudiced consideration of all these circumstances must lead to the conclusion, that though the theory of Neumann is hardly susceptible of direct proof, it has, at all events, a great deal to say for itself; and that the marrow deserves, if any tissue of the body does, special notice with respect to the question of the transformation of blood-cells.

Eales' own researches have been especially directed to the ribs, but he has obtained similar results from the apophyses of the long bones, the sternum, and the diploë of the skull.

The method of investigation, which is substantially that of Neumann, is as follows: A sawn-off piece of bone is gently pressed between a vice or pair of pincers till a thick reddish fluid oozes out from the cut surface. This is removed with a pipette and examined under the microscope without any addition, and is most advantageously covered with small fragments of covering-glass. An enormous abundance of lymphoid cells, of the most various size, at once strikes the eye; true red corpuscles are present, but in very small number. The peculiar cell-forms designated as transitional, which are here so important, have been repeatedly observed to occur in varieties which may be arranged in the series described below; a series forming a perfect chain of connection without any important break from the white to the red cells, or at least hardly admitting of any other equally satisfactory interpretation. Beginning with the white or lymph cell, the series is as follows:

1. Colorless granular cells without a visible nucleus (ordinary lymph-corpuscles).
2. Smaller cells of the same kind, without more irregular outline, and without a visible nucleus.
3. Cells almost of the same size, with a large granulated nucleus, and in its neighborhood a few scattered granules; and also with an annular or crescentic slightly yellowish border.
4. Cells of the same size, with a similar border, a somewhat smaller nucleus; no granules.
5. Cells of about the same size, with a sharp outline, a somewhat more distinct yellow color, and a still smaller granulated nucleus in the middle (half-way or middle stage).
6. The same, with a more or less homogeneous, sometimes slightly concave, nucleus.
7. The same, with scattered irregular granules (remains of the nucleus).
8. More decidedly yellow; somewhat smaller; without nucleus.
9. Yet smaller; more intensely colored, without nucleus (ordinary red blood-corpuscles).

It will be seen from this short description of the different cell-forms, that they constitute so unbroken a series that one might be tempted on this basis alone to refer the metamorphosis of blood-elements, without hesitation, to the marrow: if, however, there were no confirmatory grounds, the author would not venture to draw this conclusion, since the cells in question might be susceptible of another interpretation.

The process of transformation appears to be, judging from the series of forms above described, as follows: the granulations in the lymph-corpuscles diminish from the periphery, next they lose near the centre some scattered granulations, while the remaining hyaline substance begins to be colored yellow so soon as the granulations have quite disappeared, though with little general diminution in the size of the cell; the nucleus, previously granular, becomes small and homogeneous,—while the whole cell is still but little diminished in size,—and it is not till the nucleus has first broken up and then quite disappeared, that the size of the cell is materially diminished.

Neumann, who refers to this process only in the following words, "The protoplasm becoming colored and at the same time homogeneous,—after that disappearance of the nucleus,"—does not seem to understand the process of transformation quite in the way here sketched out, and draws especial attention to cells which are more or less homogeneous in the centre, but retain their granular character at the periphery. If, however, these represented transitional forms on their way to become red corpuscles, there should be also forms with a yellow coloration in the centre, which is not the case. Hence these forms described by Neumann may perhaps not be transitional forms at all, but rather modifications of the ordinary lymph-cells which are on their way to perish altogether. The probability that some do thus perish before conversion into red corpuscles has already been pointed out by Virchow.

With respect to the frequency of these transitional forms, they may be found in larger or smaller numbers in the fluid from all *red* marrow; at least the characteristic nucleated colored cells have never been found entirely wanting. Examinations have been made of the bodies of new-born children and adults of every age, including, in one case, a woman of ninety-eight years of age. The assertion of Neumann, that the number of transitional forms diminishes with increased age, was found to be confirmed in the extreme cases; but for intermediate cases, or generally for any universal conclusions, the number of cases (twenty or thirty) seemed insufficient. Four special cases seemed worth more detailed notice:

1. In a case of Addison's disease, the medullary fluid contained, properly speaking, *nothing but* white cells, and the transitional forms were fewer and less distinct than in any of the other cases.
2. In a woman who died of puerperal hemorrhage, transitional forms in all stages of development were extremely numerous and well defined.
3. In a woman who had committed suicide (poisoning with hydrochloric acid), transitional forms were more distinct and somewhat more numerous than in the case of individuals dying of a long or short illness.
4. In phthisical patients, about as many transitional forms as in the second case. The constant occurrence of colored cells with two nuclei was very noticeable; in one case there was a cell with three nuclei.

It should be mentioned that almost always more transitional forms were found in rabbits than in the human subject.

Cases of leukæmia were also investigated. In a case of Neumann's, he had previously observed that the vascular network, generally so richly developed in the medulla, was absent. The medullary cells were not only extremely numerous, but showed very remarkable differences in size. The few vessels which remained contained almost entirely red corpuscles. These very interesting results agree perfectly with the view that the abundance of white cells in the blood, which characterizes this disease, may be due to a diminished conversion of white cells into red, as well as to an increased production of the former. It is, however, clear, from the occasional occurrence of colored nucleated cells in the blood of leukæmic persons, that the blood metamorphosis cannot be entirely suspended, the probable explanation being that these cells have left the marrow before their complete transformation.

Eales had the opportunity of examining a femur and a rib of a leukæmic person, but not till they had been long preserved in spirit. In these specimens he found the medullary cells well developed and numerous, the vessels containing what looked like white and red corpuscles. No transitional forms were seen, but the weight of these observations was diminished by the fact that they were not made, as Neumann's were, on fresh specimens.

CARBOLIC ACID IN OTORRHŒA.—Dr. J. P. Pennefather (*Lancet*, December 3, 1870, p. 804) recommends the following injection in this affection: Carbolic acid, one drachm; glycerin, one ounce; distilled water, five ounces. Used thrice daily, it never irritates, and rapidly cures. The only complaint is the unpleasant taste in the mouth when the membrane is perforated.

MISCELLANY.

ANNUAL MEETING OF THE ALUMNI ASSOCIATIONS.—During the past year, both the University of Pennsylvania and Jefferson Medical College organized an association of their respective alumni. We are informed that both societies have given gratifying proof of the real want which existed for such associations, by the rapid increase in their numbers, and the great interest manifested among the profession in their operations. The annual meeting of these bodies will be held during Commencement week.

The Alumni Association of the University will celebrate their anniversary by a banquet at the hall of the Department of Arts, at 6 o'clock on the evening of Monday, March 13; and the annual meeting of the society will take place at 5 P.M. on Tuesday, March 14, in the Medical Department.

The annual meeting of the Alumni Association of the Jefferson Medical College will be held at the College on Saturday, March 11, at 12 o'clock. The address of the President, Prof. Samuel D. Gross, will be delivered at the College in the evening, at 7 o'clock precisely; after which the Alumni dinner will be served at Augustin's, 1105 Walnut Street.

CLINICAL INSTRUCTION IN INSANITY.—Dr. Sibbald, in a late number of the *Journal of Mental Science*, advocates this addition to the ordinary courses of medical teaching. Experience has thoroughly proved that the giving of such lectures, with due precaution, has no bad effect upon the patients whose cases are used for illustration; while there are few practitioners who have not felt the want of just the knowledge which would be thus imparted. Cases of insanity can seldom be long treated in private practice; but their early recognition, and the discrimination of their various forms, may be of the utmost consequence to all the parties interested.

THE CONTAGIOUS DISEASES ACTS.—There is a singular confusion of opinions in regard to the working of this plan for the control of prostitution and its physical effects. We find in the *British Medical Journal* of January 28 that in the inquiry by a Parliamentary committee as to the working of the acts at Plymouth, "the evidence attempting to show abuse, and the apprehension of modest women, has completely broken down, while the most conclusive proofs have been received of the admirable sanitary effects of the acts." Such statements contrast strangely with the furious outcry against the acts which has arisen in some quarters. Perhaps the truth of the matter is not easy to ascertain.

NATIONAL UNIVERSITY.—The *National Medical Journal* says, "It is contemplated to establish in Washington City a national university, embracing a literary college, besides departments of law, physic, and polytechnics, in which the highest order of talent will be employed in the various departments, and the most elevated systems of education adopted; instruction to be *free*, and accessible to both sexes." There would, we fear, be found many grave difficulties in the way of the thorough carrying out of any scheme of this kind; not the least of which would be the influence of politics, and the varying degree of favor which would shine upon it with changing administrations.

MUNIFICENT.—Earl Derby, it is stated, has made donations to the amount of £20,000 towards the establishment of a hospital at Liverpool, to be called the Stanley Hospital. We believe the gift was mainly in the form of ground, to be occupied by the institution.

SENSIBLE.—The *Boston Medical and Surgical Journal* states that "the committee of the Massachusetts Legislature, to whom was referred the proposal for a bill providing that physicians' prescriptions and apothecaries' labels should be written in the English language," have reported that "it was inexpedient to legislate in the matter." Much inconvenience and no advantage would result from the enforcement of any such law. The desired end would be far more surely attained by holding to a strict accountability those who are proved to have caused, by their carelessness or incompetence in putting up prescriptions, the death or dangerous illness of any one.

ABUSE OF INSANE HOSPITALS.—It would seem from the evidence of state papers that the late French Empire had, occasionally at least, used the *maisons de santé* for the storage of troublesome political opponents. A more convenient resource for an unscrupulous government, with shrewd and dexterous agents, could scarcely be devised.

MORTALITY OF PHILADELPHIA.—The following statements are derived from the Health Office returns:

Interments for the week ending February 11, 1871 260

Adults, 144
Minors, 116

The causes of death were reported as follows:

Diseases of Respiratory Apparatus (Consumption, 47)	96
Diseases of Brain and Nervous System	37
Debility, 25; Marasmus, 10; Old Age, 11	46
Diseases of Abdominal Organs	20
Diseases of Organs of Circulation	14
Zymotic Diseases	17
Stillborn	16
Casualties	7
Cancer	5
Intemperance	2
Unclassified, 18; Unknown, 2	20
	260

Interments for the week ending February 18, 1871 274

Adults, 139
Minors, 135

The causes of death were reported as follows:

Diseases of Respiratory Apparatus (Consumption, 43)	96
Diseases of Brain and Nervous System	43
Debility, 14; Marasmus, 6; Old Age, 13	33
Zymotic Diseases	23
Diseases of Abdominal Organs	17
Diseases of Organs of Circulation	17
Stillborn	17
Casualties	6
Cancer	3
Intemperance	3
Unclassified, 10; Unknown, 3	13
	274

OFFICIAL LIST

OF CHANGES OF STATIONS AND DUTIES OF OFFICERS OF THE MEDICAL DEPARTMENT U. S. ARMY, FROM FEBRUARY 4, 1871, TO FEBRUARY 17, 1871, INCLUSIVE.

SLOAN, WM. J., SURGEON.—At Louisville, Ky., Headquarters Department of the South, moved from Atlanta, Ga., to Louisville, Ky.

MILHAU, J. J., SURGEON.—At Louisville, Ky., Attending-Surgeon, Headquarters Department of the South, moved from Atlanta, Ga., to Louisville, Ky.

BILL, J. H., SURGEON.—By S. O. 58, War Department, A. G. O., February 9, 1871, so much of S. O. 385, A. G. O., December 31, 1870, as discharges this officer, is hereby revoked.

MICHLER, W. H. H., ASSISTANT-SURGEON.—By S. O. 22, C.S., Headquarters Department of the Platte, assigned to temporary duty at Omaha Barracks, Nebraska.